# PROCEEDINGS

OF THE

# MADRAS GOVERNMENT

IN THE

# PUBLIC WORKS DEPARTMENT,

## IRRIGATION BRANCH,

PUBLIC WORKS SECRETARIAT
22-v-91
OOTACAMUND.

FOR THE

## MONTH OF MARCH 1891.

*Printed by Authority.*

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1891.

# INDEX

TO THE

## TABLE OF CONTENTS AND TABULAR STATEMENT OF MISCELLANEOUS PROCEEDINGS AND MATTERS OF ROUTINE,

### IRRIGATION,

FOR THE MONTH OF MARCH 1891.


| | — | Page. |
|---|---|---|
| **A** | | |
| *Appropriations* ... ... ... ... ... ... ... ... | Regular. | 3 |
| *Administration Report* of the Irrigation Branch, Madras, for 1889-90. Review by the Government of India of the — ... ... ... | Regular. | 5 |
| *Ariyagosti Channel.*—South Arcot District ... ... ... ... | Routine. | 4 |
| **B** | | |
| *Buckingham Canal.*—Diversion of the — in certain places ... ... | Regular. | 2—5 |
| *Bank Canal.*—Diversion of the — at Pennumudi ... ... ... | Regular. | 6 |
| **C** | | |
| *Conservancy Establishment*—Periyár Project ... ... ... ... | Regular. | 2 |
| *Coal* —Carriage of — by the Buckingham canal ... ... ... | Regular. | 3 |
| *Contractor Chinnasawmy,* South Arcot division ... ... ... | Routine. | 1 |
| *Crops* in the South Arcot division ... ... ... ... ... | Routine. | 1 |
| *Correspondence* ... ... ... ... ... ... ... ... | Routine. | 4 |
| **D** | | |
| *Dredger* required for the Godávari Eastern division ... ... ... | Routine. | 3 |
| **E** | | |
| *Excess outlay* on certain works in II Circle ... ... ... ... | Regular. | 2 |
| *Erratum* ... ... ... ... ... ... ... ... | Routine. | 1 |
| *Expenditure incurred by the several Tank Restoration Parties* ... ... | Routine. | 3 |

| | – | Page. |
|---|---|---|
| **F** | | |
| *Flood-gate* south bank Pennér river ... ... ... ... ... | Regular. | 2 |
| **G** | | |
| *Grant* for the Godávari delta ... ... ... ... ... ... | Regular. | 1 |
| *Gopálpur canal.*— Nowgom portion of the —. ... ... ... | Regular. | 3 |
| *Grant.*—Redistribution of — for No. I Periyár division ... ... | Regular. | 4 |
| *Godávari delta system.*—Work chargeable to 49. Major Works in the —. ... ... ... ... ... ... ... ... ... | Regular. | 5 |
| *Grant*, under 43. Minor Works and Navigation ... ... ... | Routine. | 1 |
| *Government of India selections* ... ... ... ... ... ... | Routine. | 2 |
| **H** | | |
| **I** | | |
| *Indirect Revenue* of certain Irrigation systems ... ... ... ... | Regular. | 3 |
| *Inspection notes* of the Eastern section of the Kistna delta ... ... | Regular. | 4 |
| *Irrigation Cess Fund* withdrawal of grant to the Salem district under —. | Routine. | 2 |
| *Irrigation Rates.*— ... ... ... ... ... ... ... | Routine. | 2 |
| *Issue of letters of credit* to the Executive Engineer, Vizagapatam division ... ... ... ... ... ... ... ... ... | Routine. | 3 |
| *Indent* ... ... ... ... ... ... ... ... ... | Routine. | 3 |
| *Issue of letters of credit* to the Executive Engineer, Godávari Eastern division ... ... ... ... ... ... ... ... ... | Routine. | 4 |
| *Indirect Revenue* of certain systems ... ... ... ... ... | Rontine. | 4 |
| **J** | | |
| **K** | | |
| *Kalingaroyen channel* ... ... ... ... ... ... ... | Regular. | 6 |
| *Kaldindlkodu side channel* ... ... ... ... ... ... | Regular. | 6 |
| *Kurnool-Cuddapah canal* ... ... ... ... ... ... ... | Regular. | 6 |
| **L** | | |
| *Lock at Gopalpuram* ... ... ... ... ... ... ... | Regular. | 1 |
| *Lascars* for the Chingleput division ... ... ... ... ... | Regular. | 4 |
| *Lahara Khandi River.*—Extending the right embankment of the — above the Goomsúr anicut ... ... ... ... ... ... | Regular. | 5 |
| *Lands*, required for the Periyár Project works ... ... ... | Regular. | 5 |

| | — | Page. |
|---|---|---|
| **M** | | |
| *Modification of allotments* ... ... ... ... ... ... | Regular. | 1—2—4—6 |
| *Modification of grants* ... ... ... ... ... ... ... | Routine. | 1 |
| *Minor irrigation works.*—Distribution of grants for — ... ... | Routine. | 1 |
| *Minor irrigation works.*—Progress reports of — ... ... ... | Routine. | 2 |
| **N** | | |
| *Naudyur channel*—Trichinopoly division ... ... ... ... | Regular. | 4 |
| *Nallur channel*—Kistna Western delta ... ... ... ... | Regular. | 4 |
| **O** | | |
| **P** | | |
| *Periyár Project*—Progress report ... ... ... ... .. | Regular. | 1—5 |
| *Potumeraka channel*—Kistna Western division ... ... ... .. | Regular. | 3 |
| *Pulsometer* for the Periyár Project ... ... ... ... ... | Regular. | 3 |
| *Progress report of works in* No. I Periyár division ... ... ... | Regular. | 4 |
| *Progress report of works* in No. II Periyár division ... ... .. | Regular. | 4 |
| *Periyár Project works.*—Report of inspection of the — by the Chief Engineer, Public Works Department ... ... ... ... | Regular. | 5 |
| *Periyár Project.*—Progress report of — ... ... ... .. | Routine. | 1 |
| *Preliminary* budget for Minor works and Navigation ... ... ... | Routine. | 1 |
| *Periyár Project.*—Turbine for the — ... ... ... ... ... | Routine. | 3 |
| **Q** | | |
| *Quarters at Duggirala.*—Executive and Assistant Engineers' — ... | Regular. | 5 |
| **R** | | |
| *Rushikulya Project.*—Notes of inspection of the — works ... ... | Regular. | 2 |
| *Roya channel*—Bellary division ... ... ... ... ... | Regular. | 3 |
| *River embankments in the* Tanjore division ... ... ... ... | Routine. | 1 |
| *Rushikulya Project.*—Explanation of necessity for additional grant for the —. ... ... ... ... ... ... ... ... ... | Routine. | 2 |
| *Revenue report of* Irrigation works in Rajputana ... ... ... | Routine. | 2 |
| *Rushikulya Project.*—Plans of the — ... ... ... ... ... | Routine. | 2 |
| *Rushikulya canal.*—Inspection report of Colonel Home, R.E., of the —. ... ... ... ... ... ... ... ... ... | Routine. | 2 |
| *Report of the state of season* in Chingleput ... ... ... ... | Routine. | 3 |

| | ÷ | Page. |
|---|---|---|
| *Report of the state of season*—Coimbatore ... ... ... ... | Routine. | 3 |
| *Rushikulya Project.*—Plans relating to the — ... ... ... ... | Routine. | 3 |
| **S** | | |
| *Sluices* in Uttramallur tank ... ... ... ... ... ... | Regular. | 1 |
| Steamer for the Periyár Project ... ... ... ... ... | Regular. | 2 |
| *Scientific Instruments* ... ... ... ... ... ... ... | Regular. | 2 |
| *Sluices* at the Sitanagaram end of the Kistna anicut ... ... ... | Regular. | 2 |
| *Surplus channel* of the Tennari tank, Chingleput division ... ... | Regular. | 3 |
| *Surrenders* ... ... ... ... ... ... .. ... | Routine. | 2 |
| **T** | | |
| *Transfer of funds* ... ... ... ... ... ... ... ... | Regular. | 1—3—6 |
| *Tank.*—Bhímavaram — ... ... ... ... ... ... ... | Regular. | 2 |
| *Tools and plant* for No. I Periyár division ... ... ... ... | Regular. | 4 |
| *Tank.*—Avanipoor — South Arcot division ... ... ... ... | Regular. | 4 |
| *Tank.*—Locherla—Anantapur district ... ... ... ... ... | Regular. | 5 |
| *Tank.*—Bramanakraka Krakamma—Nellore district ... ... ... | Regular. | 5 |
| *Tank.*—Griddalore — ... ... ... ... ... ... ... | Regular. | 5 |
| *Tank.*—Kadingiyur — ... ... ... ... ... ... ... | Regular. | 6 |
| *Tank.*—Alikuli — ... ... ... ... ... ... ... | Regular. | 6 |
| *Tank.*—Nellore — ... ... ... ... ... ... ... | Routine. | 4 |
| *Transfer of funds* ... ... ... ... ... ... ... | Routine. | 2—3—4 |
| *Travelling allowance* to certain lascars ... ... ... ... ... | Routine. | 2 |
| *Tents* of No. 5, Tank Restoration Party ... ... ... ... | Routine. | 4 |
| **U** | | |
| **V** | | |
| **W** | | |
| *Wharves* at Papanchavadi and Pedda Ganjam ... ... ... | Regular. | 3 |
| **X** | | |
| **Y** | | |
| **Z** | | |

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

---

## TABLE OF CONTENTS,

### IRRIGATION,

### FOR THE MONTH OF MARCH 1891.

| 1<br>Subjects. | 2<br>Dates of Proceedings. | 3<br>Date of Report to Secretary of State for India. | 4<br>Numbers and Dates of previous Proceedings. |
|---|---|---|---|
| *Periyár Project.*—Progress report of works on the — for January 1891, recorded, and a copy ordered to be forwarded to the Government of India. | 1891.<br>2nd Mar.<br>No. 190 I. | ... | 6th Feb. 1891, No. 653 C.<br>19th Jan. 1891, No. 58 I.<br>24th Jan. 1891, No. 232 W.<br>29th July 1890, No. 2066 W.<br>16th Dec. 1890, No. 5277 C.<br>8th Nov. 1890, No. 4594 C.<br>11th Nov. 1890, No. 4624 C. |
| Copy of the above forwarded to the Government of India. | 2nd Mar.<br>No. 191 I. | ... | ...... |
| *Transfer of funds.*—Sanctioning certain —. | 2nd Mar.<br>No. 192 I. | ... | ...... |
| *Lock at Gopalpuram.*—Authorising the Examiner, Public Works Accounts, to admit the outlay incurred in constructing a — in the Godávari Central delta. | 2nd Mar.<br>No. 193 I. | ... | ...... |
| *Modification of allotments.*—Sanctioning certain — in the I Circle. | 2nd Mar.<br>No. 194 I. | ... | ...... |
| *Sluices in Uttramallur tank, Chingleput district.*—Revised estimate of Rs. 15,400 for reconstructing the Vasudevan, Katsupaukam and Pulvoy —. | 2nd Mar.<br>No. 198 I. | ... | ...... |
| *Godávari delta.*—Approving the redistribution of the existing grant of Rs. 37,378 for the — under 49. Major Works (Construction). | 3rd Mar.<br>No. 200 I. | ... | 11th Aug. 1890, No. 428 I.<br>17th Nov. 1890, No. 664 I. |

| 1<br>Subjects. | 2<br>Dates of Proceedings. | 3<br>Date of Report to Secretary of State for India. | 4<br>Numbers and Dates of previous Proceedings. |
|---|---|---|---|
| *Excess outlay on certain works in the II Circle.*—The Examiner, Public Works Accounts, authorised to pass the —. | 1891.<br>4th Mar.<br>No. 202 I. | ... | 19th Nov. 1890,<br>No. 675 I.<br>27th Nov. 1890,<br>No. 696 I.<br>8th Dec. 1890,<br>No. 733 I. |
| *Flood gate, South bank, Pennér river.*—Revised estimate of Rs. 24,100 for constructing the —, sanctioned ... ... ... ... | 4th Mar.<br>No. 203 I. | ... | ...... |
| *Bhimavaram tank, Nellore division.*—Estimate of Rs. 4,530 for improving the —, sanctioned. | 4th Mar.<br>No. 204 I. | ... | ...... |
| *Kistna anicut.*—Revised estimate of Rs. 16,400 for fixing shutters with screw gearing to the under sluices at the Sitanagaram end of the —, sanctioned. | 4th Mar.<br>No. 205 I. | ... | 21st Feb. 1884,<br>No. 217 I.<br>28th Oct. 1885,<br>No. 915 I.<br>1st Oct. 1888,<br>Nos. 577-78 I.<br>6th Jan. 1891,<br>No. 15 I. |
| *Buckingham canal.*—Revised estimate of Rs. 21,500 for diversion to the — near Dugarázpatam, sanctioned. | 4th Mar.<br>No 206 I. | ... | 17th Dec. 1889,<br>No. 623 I.<br>9th Apr. 1890,<br>No. 218 I. |
| *Steamer for the Periyár project.*—The purchase of a second —, sanctioned. | 4th Mar.<br>No. 208 I. | ... | 11th Sept. 1888,<br>No. $\frac{2828}{A.}$ W.<br>15th Oct. 1888,<br>No. 3278 W.<br>15th Aug 1889,<br>No. 3681 C.<br>4th Sept. 1889,<br>No. 3956 C.<br>26th Sept. 1889,<br>No. 2695 W. |
| *Scientific and Mathematical instruments for No. IV Tank Restoration Survey Party.*—Estimate of Rs. 40 for purchasing —, sanctioned. | 5th Mar.<br>No. 209 I. | ... | ...... |
| *Conservancy establishment, Periyár project.*—Estimate of Rs. 3,500 for — required during 1890-91, sanctioned. | 7th Mar.<br>No. 217 I. | ... | 6th Dec. 1890,<br>No. 5072 C.<br>23rd Jan. 1888,<br>No. 51 I.<br>6th Sept. 1888,<br>No. 521 I. |
| *Rushikulya Project works.*—Notes of inspection by the Chief Engineer for Irrigation of the —, communicated to the Superintending Engineer, I Circle, for information and guidance. | 7th Mar.<br>No. 218 I. | ... | ...... |
| *Modifications of allotments.*—Sanctioning certain — recommended by the Chief Engineer for Irrigation. | 7th Mar.<br>No. 219 I. | ... | ...... |

| 1<br>Subjects. | 2<br>Dates of Proceedings. | 3<br>Date of Report to Secretary of State for India. | 4<br>Numbers and Dates of previous Proceedings. |
|---|---|---|---|
| *Transfers of funds.*—Sanctioning certain — under 49, Major Works (Construction). | 1891.<br>7th Mar.<br>No. 220 I. | ... | 12th Feb. 1880,<br>No. 79 I. |
| Copy of the above forwarded to the Government of India. | 7th Mar.<br>No. 221 I. | ... | ...... |
| *Transfers of funds.*—Sanctioning certain —. | 7th Mar.<br>No. 222 I. | ... | ...... |
| *Appropriations.*—Appropriating funds for certain works in the Chingleput district. | 7th Mar.<br>No. 224 I. | ... | ...... |
| *Roya channel, Bellary division.*—Estimate amounting to Rs. 37,300 for improving the —, sanctioned. | 9th Mar.<br>No. 225 I. | ... | ...... |
| *Surplus channel of the Tenneri tank, Chingleput division.*—Estimate of Rs. 4,800 for constructing a calingula across the —, sanctioned. | 9th Mar.<br>No. 226 I. | ... | ...... |
| *Potumeraka channel, Kistna Western division.*—Estimate of Rs. 7,890 for the —, sanctioned. | 9th Mar.<br>No. 227 I. | ... | 1st March 1888,<br>No. 156 I.<br>1st Oct. 1888,<br>No. 577 I.<br>24th Mar. 1890,<br>No. 193 I. |
| *Gopálpur canal.*—Note by the Chief Engineer for Irrigation on the proposal for completing the Nowgam portion of the — as far as Chatrapur, communicated to the Consulting Engineer for Railways with remarks. | 9th Mar.<br>No. 228 I. | ... | ...... |
| *Indirect Revenue.*—The Examiner, Public Works Accounts, directed to credit against certain systems the amounts noted against them as — in the accounts of the current year. | 9th Mar.<br>No. 229 I. | ... | 3rd Aug. 1889,<br>No. 362 I. |
| *Wharves.*—Notification declaring the — at Papanchavadi and at Pedda Ganjam to be open for public traffic ordered to be published in the *Fort St. George Gazette* and Kistna and Nellore District Gazettes. | 9th Mar.<br>No. 230 I. | ... | ...... |
| *Coal.*—Declining to give to the Hyderabad-Deccan Company (Limited) any undertaking as to the suitability of the Buckingham canal for the carriage of — on an extensive scale and forwarding to the Company a copy of the navigation rules in force. | 9th Mar.<br>No. 233 I. | ... | 5th Aug. 1882,<br>No. 612 I.<br>14th Mar. 1883,<br>No. 841 W.<br>24th Sept. 1886,<br>No. 663 I.<br>10th Dec. 1886,<br>No. 926 I. |
| *Transfer of funds.*—The — proposed by the Superintending Engineer, I Circle, in the Ganjam division, sanctioned. | 12th Mar.<br>No. 237 I. | ... | ...... |
| *Pulsometer.*—The purchase of a — for the No. II Periyár division, sanctioned. | 12th Mar.<br>No. 238 I. | ... | ...... |

| 1<br>Subjects. | 2<br>Dates of Proceedings. | 3<br>Date of Report to Secretary of State for India. | 4<br>Numbers and Dates of previous Proceedings. |
|---|---|---|---|
| *Tools and plant for No. I Periyár division.*—Estimate of Rs. 23,800 for —, sanctioned. | 1891.<br>13th Mar.<br>No. 240 I. | ... | 3rd Feb. 1891,<br>No. 319 W. |
| *Lascars for the Chingleput division.*—Estimate of Rs. 234 for three — for 13 months for work establishment, sanctioned. | 13th Mar.<br>No. 241 I. | ... | 21st Jan. 1891,<br>No. 188 W. |
| *Progress report of works in No. II Periyár division.*—Ordered that a copy of the — for January 1891, be forwarded to the Government of India. | 13th Mar.<br>No. 242 I. | ... | ...... |
| Forwarded ... ... ... ... ... | 13th Mar.<br>No. 243 I. | ... | ...... |
| *Redistribution of allotments for No. I Periyár division.*—The proposed —, approved ... | 13th Mar.<br>No. 244 I. | ... | 1st Dec. 1890,<br>No. 698 I.<br>19th Jan. 1891,<br>No. 61-I A.<br>24th Jan. 1891,<br>No. 70-I A.<br>23rd Feb. 1891,<br>No 167 I.<br>27th Feb. 1891,<br>No. 188 I. |
| *Nundyur channel, Trichinopoly division.*—Estimate of Rs. 26,800 for extending the —, sanctioned. | 13th Mar.<br>No. 245 I. | ... | ...... |
| *Nallur channel, Kistna Western delta.*—Estimate amounting to Rs. 4,680 for the — and its branches, sanctioned with remarks. | 13th Mar.<br>No. 246 I. | ... | 1st Oct. 1888,<br>No. 577 I.<br>9th Dec. 1887,<br>No. 778 I. |
| *Modifications of allotments.*—The — proposed by the Chief Engineer for Irrigation, sanctioned. | 13th Mar.<br>No. 247 I. | ... | ...... |
| *Avanipoor tank, South Arcot division.*—Estimate of Rs. 4,040 for constructing stone revetment to —, sanctioned. | 13th Mar.<br>No. 248 I. | ... | ...... |
| *Inspection Notes.*—Communicating to the Superintending Engineer, II Circle, the — of the Chief Engineer for Irrigation of the eastern section of the Kistna delta, and noticing with pleasure the favorable testimony borne by the Chief Engineer to the efficiency of Mr. Jopp, Executive Engineer in charge of Kistna Eastern division. | 13th Mar.<br>No. 249 I. | ... | ...... |
| *Progress report of works in No. II Periyár division.*—Ordered that the — for February 1891, be forwarded to the Government of India. | 17th Mar.<br>No. 255 I. | ... | ...... |
| Forwarded ... ... ... ... ... | 17th Mar.<br>No. 256 I. | ... | ...... |

| 1<br>Subjects. | 2<br>Dates of Proceedings. | 3<br>Date of Report to Secretary of State for India. | 4<br>Numbers and Dates of previous Proceedings. |
|---|---|---|---|
| *Locherla tank.*—The proposal of the Chief Engineer for Irrigation to add the — to the list of imperial works in the Anantapur district, sanctioned | 1891.<br>17th Mar.<br>No. 257 I. | ... | ...... |
| *Bramanakraka-Krakamma tank.*—Estimate of Rs. 4,120 for improvements to the — and supply channel, Nellore division, sanctioned. | 17th Mar.<br>No. 258 I. | ... | ...... |
| *Quarters at Duggirala.*—Authorising the Examiner, Public Works Accounts, to pass the excess outlay incurred in constructing the Examiner's and Assistant Engineer's —. | 17th Mar.<br>No. 259 I. | ... | ...... |
| *Laharakandi river.*—Estimate of Rs. 3,200 for extending the — right embankment above the Goomsur anicut, sanctioned. | 17th Mar.<br>No. 260 I. | ... | ...... |
| *Irrigation works in the Madrás Presidency.*—Passing orders on the review by the Government of India of the Administration Report of — for 1889-90. | 17th Mar.<br>No. 261 I. | ... | ...... |
| *Periyár Project Works.*—Passing orders on the notes of inspection of the — by the Chief Engineer, Public Works Department. | 17th Mar.<br>No. 262 I. | ... | ...... |
| Copy of the above forwarded to the Government of India. | 17th Mar.<br>No. 263 I. | ... | ...... |
| *Buckingham canal.*—The recommendations of the Chief Engineer for Irrigation to carry out the diversion of the — in certain places as relief works, approved, and an upper subordinate ordered to be posted to the Buckingham canal division. | 17th Mar.<br>No. 267 I. | ... | ...... |
| *Godávari delta system.*—The revised schedules of works to be carried out on the — chargeable to "49. Major Works—Construction," sanctioned. | 19th Mar.<br>No. 268 I. | ... | 11th Aug. 1890,<br>No. 428 I.<br>17th Nov. 1890,<br>No. 664 I. |
| Copy of the above forwarded to the Government of India. | 19th Mar.<br>No. 269 I. | ... | ...... |
| *Periyár Works.*—Report of progress of the — for February 1891, recorded, and a copy ordered to be forwarded to the Government of India. | 21st Mar.<br>No. 274 I. | ... | 2nd Mar. 1891,<br>Nos. 190-91 I. |
| Copy of the above forwarded to the Government of India. | 21st Mar.<br>No. 275 I. | ... | ...... |
| *Griddalore tank, Nellore division.*—Estimate of Rs. 16,600, for restoring the —, sanctioned. | 21st Mar.<br>No. 277 I. | ... | ...... |
| *Lands required for the Periyár Project Works.*—Ordered that the notification for the acquisition of — in the Madura district be published in the *Fort St. George Gazette.* | 21st Mar.<br>No. 278 I. | ... | ...... |

| 1<br>Subjects. | 2<br>Dates of Proceedings. | 3<br>Date of Report to Secretary of State for India. | 4<br>Numbers and Dates of previous Proceedings. |
|---|---|---|---|
| *Kalingarayen channel, Coimbatore district.*—Letter from the Government of India communicating sanction of the Secretary of State to the improvement and extension of the —, communicated to officers concerned. | 1891.<br>21st Mar.<br>No. 279 I. | ... | 16th Sept. 1890, Nos. 519-20 I.<br>9th Jan. 1891, No. 25 I. |
| *Kalingarayen channel, Coimbatore district.*—The Government of India requested to return the portfolios of the maps and plans of the — project. | 21st Mar.<br>No. 280 I. | ... | ...... |
| *Kadingiyur tank, Chingleput division.*—Estimate of Rs. 4,930 for improving the —, sanctioned. | 21st Mar.<br>No. 281 I. | ... | ...... |
| *Alikuli tank, Chingleput division.*—Estimate amounting to Rs. 5,790 for constructing a weir and repairing the bund of the —, sanctioned. | 21st Mar.<br>No. 283 I. | ... | ...... |
| *Bank canal, Kistna delta system.*—Estimate of Rs. 22,400 for the diversion of the — at Penumudy, sanctioned. | 24th Mar.<br>No. 286 I. | ... | ...... |
| *Modification of allotments.*—Sanctioning certain — under 49. Irrigation, Kistna Western division. | 24th Mar.<br>No. 288 I. | ... | ...... |
| *Kaldindikodu side channel.*—Estimate amounting to Rs. 4,500 for the —, Kistna Eastern delta, sanctioned. | 25th Mar.<br>No. 291 I. | ... | ...... |
| *Kurnool-Cuddapah canal.*—Passing orders regarding the value of water supplied to tanks by the — being credited to the canal as indirect revenue. | 25th Mar.<br>No. 292 I. | ... | ...... |
| *Transfers of Funds.*—Sanctioning certain —. | 25th Mar.<br>No. 293 I. | ... | ...... |
| *Modification of allotments, II Circle.*—Sanctioning certain —. | 30th Mar.<br>No. 302 I. | ... | ...... |

# PUBLIC WORKS DEPARTMENT,

## IRRIGATION BRANCH.

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# PROCEEDINGS OF THE MADRAS GOVERNMENT,

## FOR THE MONTH OF MARCH 1891.

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### Irrigation.

READ—the following papers :—

From H. S. TAYLOR, Esq., Superintendent of Works, No. I Periyár division, dated Thekady, 11th February 1891, No. 431-S.E.

REPORT OF PROGRESS FOR JANUARY 1891.

*Main dam.*—The water was pumped out between the two rear walls, and, with the exception of a layer of soft cement on the top and some loose stones, the concrete was found to have set and the leaks practically stopped. Concrete was rammed dry on the top and the space between the walls filled in solid up to + 5, the leaks being entirely overcome. The inner front wall was raised to 16 ; cross walls with concrete behind them were put in dry, where possible, at the bottom of the space which was left only 20′ × 2′.

2. In the centre portion of the foundation a network of partition walls, 2 feet thick, was built and concrete rammed in the spaces between them, the small springs thus isolated being confined in 6-inch cut-stone wells. Widening behind the weak portion of the left flank of the front wall was carried up to 10. These operations were in progress when the fresh of the 20th occurred, which has been separately reported upon. The water rising to + 28 filled everything with water, and, with the exception of raising the extension of the front wall to + 25 as far as the first vent, the rest of the month was taken up in pumping out the water. Another pier and vent (No. 7) in line of the front wall were commenced.

3. *Main workshop.*—Fitting the disintegrators was completed. Driving station of B tramway completed and gearing fitted. Excavation for the first curve done and portion of the timber set up. Two stone-crushers fitted in their places. Water-supply piping was laid from the workshop to the reservoir. The engine received from Madras was fitted on a barge to work the sand pump. Concrete floor of the shops completed.

4. *Right bank escape.*—Work making steady progress. The two engines working, four stone-breakers were at work and materials supplied down the inclined tramway to the main dam.

5. *In Thekady sub-division, No.* 2 *lock* weir made good progress, all the concrete for the body wall foundation was laid and 20 feet more length of body wall raised.

6. *Wire tramway.*—Line A.C. was properly adjusted to required sag. The turbine pipes were being fitted and masonry seating built up under them.

7. *Water-shed cutting* has been in progress to the west of the cross bund opposite the camp. A pit was excavated at the point where the open cutting becomes 30 feet deep. This was carried down to a depth of 7 feet above the roof of the tunnel and no rock reached, showing necessity of continuing open cutting further than was expected. The cross wall beyond the bank was completed.

8. *Tunnel.*—Hand-drilling proceeded in the north end, showing a progress of 21 feet, total length 868 feet. The atmosphere is foul and heat excessive in the absence of ventilating arrangements which depend on water which has failed. The new shaft was started and sunk 20 feet. The road to this shaft was made and sheds for machinery and firewood erected.

9. The detachment of the 1st Pioneers was suddenly withdrawn during the last 10 days of the month. The delay caused by this sudden withdrawal, with not a week's notice, of 400 working men would have been more conspicuous had not the flood occurred preventing possibility of work on the main dam foundations.

10. Health has been fairly good, but scarcity of water is serious at Thekady. Wells have been sunk, but the water is unwholesome. Steps will be taken to improve this if possible.

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*Note by the Chief Engineer, Public Works Department.*

Submitted for the information of Government.

2. The progress as a whole is good, though the tunnel continues backward owing to the want of water, and the work on the main dam has been much interfered with by the flood of the 20th January.

3. It is probable that in a few days more the amount of pumping required at the main dam will be greatly reduced, and it might be worth while to move one of the portable engines to the mouth of the tunnel to drive the ventilating fan, as long as there is no water available for the purpose.

A separate reference has been made on the subject of the sudden removal of the Pioneers.

(Signed) J. PENNYCUICK, Colonel, R.E.,
Chief Engineer, P.W.D.

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ORDER—dated 2nd March 1891, No. 190 I., Public Works.

Recorded and a copy forwarded to the Government of India for information.

(Here enter No. 191 I., dated 2nd March 1891.)

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintendent of Works, Periyár Project.
" Chief Engineer for Irrigation.
" Revenue Department.

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ENDORSEMENT—dated 2nd March 1891, No. 191 I., Public Works.

Forwarded to the Government of India in continuation of endorsement No. 58 I., dated 19th January 1891.

(By Order.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

IRRIGATION.

Govt. of {1891} Madras.

PUBLIC WORKS.

*Dated March, 2nd.*

*Recd.* *Encl.*

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**G.O., 2nd Mar. 1891, Nos. 190 I., 191 I.**

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**MARCH.**

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**Periyar Project**

Forwarding the progress report of works on the — for January 1891.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper :—

From Lieut.-Colonel A. C. SMITH, R.E., Superintending Engineer, VI Circle, to the Chief Engineer for Irrigation, dated Trichinopoly, 17th February 1891, No. 1070 T.N.

I have the honor to request that the following modification of allotments in the Tinnevelly division may be sanctioned at an early date :—

| Item number. | — | Existing grant. | Modification of allotment applied for. | | Modification of allotment proposed. | |
|---|---|---|---|---|---|---|
| | | | Reduction. | Increase. | Reduction. | Increase. |
| | PROVINCIAL IRRIGATION. | RS. | RS. | RS. | RS. | RS. |
| | 43. MINOR WORKS AND NAVIGATION. | | | | | |
| | *Works for which Capital and Revenue accounts are kept.* | | | | | |
| | Revenue account. | | | | | |
| | Marudur anicut systems. | | | | | |
| | Extensions and improvements. | | | | | |
| 1 | Minor works (lump sum) .. .. .. | 5,000 | 1,300 | .. | 1,300 | .. |
| | 43. MINOR WORKS AND NAVIGATION. | | | | | |
| | *Works for which neither Capital nor Revenue accounts are kept.* | | | | | |
| | Original works, major. | | | | | |
| 2 | Kumarasawmy Pillay anicut, restoring the —; estimate Rs. 16,600, sanctioned in G.O., No. 16 I. of 8th January 1890 .. .. .. | 8,000 | .. | 1,300 | .. | 1,300 |
| | Total .. | .. | 1,300 | 1,300 | 1,300 | 1,300 |

2. *Item* 1.—Owing to certain estimates having had to be classed as maintenance and repairs instead of minor extensions and improvements as anticipated, a portion of grant is surrendered.

*Item* 2.—The work being in fair progress, an additional grant is required, which may be met from item 1 above.

Order—dated 2nd March 1891, No. 192 I., Public Works.

The following transfers of funds are sanctioned :—

Provincial.
43. Minor Works and Navigation.
Tinnevelly division.

| *From* | | *To* | |
|---|---|---|---|
| Irrigation and Navigation works for which Capital and Revenue accounts are kept. Revenue account. | | Irrigation and Navigation works for which neither Capital nor Revenue Accounts are kept. | RS. |
| Marudur anicut system. | RS. | Kumarasawmy Pillay anicut restoration ... ... ... ... | 1,285 |
| Extensions and improvements ... | 1,300 | Establishment ... ... ... | 295 |
| Establishment ... ... ... | 299 | Tools and plant ... ... ... | 19 |
| Total ... | 1,599 | Total ... | 1,599 |

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, VI Circle.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 2nd.*

*Recd.* *Encl.*

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**G.O., 2nd Mar. 1891, No. 192 I.**

---

**MARCH.**

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**Transfers of Funds**

Sanctioning certain —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers :—

From G. D. WYBROW, Esq., Superintending Engineer, I Circle, to the Chief Engineer for Irrigation, dated Doegam, 21st January 1891, No. 20 C.

I have the honor to bring to your notice that the Executive Engineer, Western division, Godávari, has incurred an excess expenditure of Rs. 2,927 over the estimate (Rs. 13,700) for the work, "constructing a lock at Gopálpuram" in Central delta, sanctioned in G.O., No. 738 I., of 23rd November 1887, under capital account, and to request that you will be so good as to obtain the sanction of Government to the same.

2. The excess outlay is due (1) to extra cost on account of excavation, chiefly owing to the work being spread over two seasons; (2) to extra carriage of stone from distant quarries; (3) to extra cost of Janampetta stone, Dowlaishweram stone not being available; (4) to extra cost on account of timbering required for the concrete.

Office-note to the Examiner of Public Works Accounts, dated 13th February 1891, No. 47.
" from the " " " " " 18th " " " 1019.

ORDER—dated 2nd March 1891, No. 193 I., Public Works.

The Examiner of Public Works Accounts is authorized to admit the outlay incurred on the work referred to in the foregoing letter from the Superintending Engineer, I Circle.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle, with one enclosure.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 2nd.*

*Recd.* *Encl.*

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**G.O., 2nd Mar. 1891, No. 193 I.**

---

**MARCH.**

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**Lock at Gopalpuram**

Authorizing the Examiner, Public Works Accounts, to admit the excess outlay incurred in constructing a — in the Godávari Central delta.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.
### Account.

Read—the following paper :—

Statement of modification of allotments under 43. Minor works and navigation for 1890-91, Vizagapatam division.

| Division. | No. of items. | Name of works. | Existing grant. | Outlay to end of January 1891. | Modification applied for by Executive Engineer. Reduction. | Modification applied for by Executive Engineer. Increase. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | RS. | RS. | RS. | RS. | |
| | | IRRIGATION. | | | | | |
| | | Works for which neither Capital nor Revenue Accounts are kept. | | | | | |
| Vizagapatam | 1 | Constructing the Pulaparthy channel head sluice and east wing wall of Koppaka anicut. | 1,834 | 2,309 | .. | 730 | This transfer from one work to the other is required to meet the excess outlay incurred on work No. 1. |
| Vizagapatam | 2 | Reconstructing Pulaparthy flood embankment. | 2,001 | 904 | 730 | .. | |
| | | Agricultural works. | | | | | |
| | | *Repairs.* | | | | | |
| Vizagapatam | .. | River embankment .. | 2,500 | 1,196 | 500 | .. | As there are not sufficient estimates on hand nor subordinates either to prepare estimates or execute works, this sum may now be surrendered. There is only the sub-divisional officer and a sub-overseer in the sub-division. |

(Signed) J. TRAILL,
Executive Engineer, Vizagapatam Division.

7th February 1891.

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No. 493 V.Z.

Copy submitted to the Chief Engineer for Irrigation for sanction.

An overseer, named P. V. Ramaswamy Iyer, is now posted to Vizagapatam division.

(Signed) G. D. WYBROW,
Superintending Engineer, I Circle.

16th February 1891.

Order—dated 2nd March 1891, No. 194 I., Public Works.

The amount of Rs. 730 surrendered from the grant for item 2 is appropriated to meet the demand for item 1. The surrender of Rs. 500 from the grant for the Vizagapatam division under Agricultural repairs, river embankments, is accepted and held in reserve under the same head.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, I Circle.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 2nd.*

*Recd.* *Encl.*

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**G.O., 2nd Mar. 1891, No. 194 I.**

---

**MARCH.**

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**Modifications of Allotments**

Sanctioning certain — in the I Circle.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers :—

From Colonel W. H. BURTON, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Madras, 5th December 1890, No. 4148.

I have the honor to submit, for sanction, a revised estimate and plans of Rs. 16,000 for reconstructing the Vasudevan, Kattupakam and Pulvoy sluices of Uttramallur tank in Chingleput district in lieu of the estimates, sanctioned in G.O., No. 287 I., dated 29th March 1886, for Rs. 9,230.

The necessity for revision of the estimates is fully explained in the report and in the comparative statement accompanying the estimate.

ENCLOSURE.

REPORT to accompany the revised plans and estimate for reconstructing the Vasudevan, Kattupakam and Pulvoy sluices of Uttramallur tank in the Madurántakam taluk. Amount of revised estimate, Rs. 15,400.

| | | RS. |
|---|---|---|
| Reconstructing | Vasudevan sluice ... ... ... ... ... | 7,600 |
| Do. | Kattupakam do. ... ... ... ... ... | 4,100 |
| Do. | Pulvoy do. ... ... ... ... ... | 3,700 |
| | Total ... | 15,400 |

In G.O., No. 287 I., dated 29th March 1886, estimates, amounting to Rs. 9,230, were sanctioned for reconstructing the following sluices in the Uttramallur tank, viz. :—

| | | RS. |
|---|---|---|
| Reconstructing | Vasudevan sluice ... ... ... ... ... | 4,780 |
| Do. | Kattupakam do. ... ... ... ... ... | 3,060 |
| Do. | Pulvoy do. ... ... ... ... ... | 1,390 |
| | Total ... | 9,230 |

Early in 1888-89 arrangements were made to commence rebuilding Vasudevan and Kattupakam sluices and Rs. 5,000 were allotted for the purpose; but, in spite of every endeavour to get the contractor (one P. Narayanasawmi Iyer) to make a start, he failed to do so and the money had to be finally surrendered, nothing having been done.

*Vasudevan sluice.*—In 1889-90 the reconstruction of the Vasudevan sluice was given to contractor Ramanuja Iyengar and work was carried out as revised and approved by the Superintending Engineer in his docket No. 6072, dated 13th December 1889, for the following reasons :—

(1) Because the foundations in the sanctioned plan were defective and the wings and face walls (even as corrected by the red lines) were weak.

(2) Because the proposed sluice was considered suitable for an equilibrium valve shutter and so a revised plan was made.

The revised plan provides a block of concrete for foundations 4¾ feet deep throughout instead of a combination of masonry and concrete, as shown in the original plan, and for wings and abutments with a back batter of 1 in 4, which is calculated to be necessary to insure

strength. There will be only one vent and that will be constructed to suit an equilibrium valve shutter, which has been designed in accordance with the Chief Engineer for Irrigation's memorandum No. V/9-S.A., dated 24th April 1887.

The sluice has been practically completed with the exception of the valve shutter, which was received from the Public Works Department Workshops after much delay, and, even when it did arrive, it was so faulty in construction that it had to be returned. The equilibrium valve box was made 1′ 6⅛″ square instead of 1′ 5¼″ square as per plan.

This was the chief reason for sending it back, though it could not have been fitted in any case as it was not sent till September 1890, when there was too much water in the tank to do the work.

The cost of Rs. 125 allowed in the estimate includes the alteration charges as reported by General Superintendent in his No. 1966, dated 28th October 1890 (letter enclosed), but it is thought that the workshop should bear the expense of altering their own faulty work.

A discharge of 24 cubic feet per second is allowed for an area of 976 acres, *i.e.*, one cubic foot per 41 acres. This discharge will be secured with the water 5·78 deep on floor of sluice which is 26·91 below full tank level.

*Kattupakam and Pulvoy sluices.*—In 1886 estimates, amounting to Rs. 3,940, were prepared for remodelling the heads and rear wings of these sluices, leaving the old bodies which were supposed to be good; on examination this was found not to be the case. The waterways are very much restricted, being only 1′ 3″ × 1′ 3″ and 1′ 3″ × 1′ 4″, respectively, in dimensions, and are of bad design, for they do not permit of a man to enter from the rear to remove silt and other obstructions to free flow. Hence the discharge in these and several other sluices of the tank is invariably impeded although there may be plenty of water and cultivation thus suffers, causing crops to partially fail for want of water. To avoid further loss of this kind, it is proposed to reconstruct the sluices as per revised plan and estimates submitted herewith.

The discharge of the sluices will be regulated by screw gearing shutters in accordance with Irrigation Circular Memorandum No. 23 G., dated 24th August 1889, or Professional Circular No. 45 B. As cisterns existed in the old sluices provision is made for them in those now proposed.

A discharge of 3·36 and 2·25 cubic feet per second is allowed for areas of 224 and 150 acres under the Kattupakam and Pulvoy sluices, respectively, and the required discharges will be secured at 1·5 and 1·37 feet above the sill. The screw gearing shutters are estimated to cost Rs. 220, Rs. 110 each, as per estimate of the General Superintendent, Public Works Workshop, sent herewith.

The estimates have been delayed for want of this information from the workshops, which had to be obtained according to Superintending Engineer's orders as expressed in his memorandum No. 1530, dated 2nd July 1890. A lump sum of Rs. 75 instead of Rs. 110 was previously entered, so for a mere trifle of Rs. 35 per sluice or Rs. 70 altogether in an estimate of Rs. 8,400, the submission of the revised estimates has been unavoidably delayed for a period of four months.

The work will be carried out according to standard specification and to the satisfaction of the Executive Engineer.

(Signed) C. H. B. BURLTON,
Executive Engineer, Chingleput Division.

6th November 1890.

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Memo. to the | Superintending Engineer, | V Circle, | dated | 10th | December | 1890, | No. | 46 C.N. |
| From the | „ | „ | V „ | „ | 17th | January | 1891, | „ 18 E.I. |
| Memo. to the | „ | „ | V „ | „ | 10th | February | „ | „ 14 C.N. |
| From the | „ | „ | V „ | „ | 23rd | „ | „ | „ 63 E.I. |
| „ | „ | „ | V „ | „ | 24th | „ | „ | „ 73 E.I. |

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No. 35 I.

Submitted to Government. The designs for the Kattupakam and Pulvoy sluices have been revised in this office. The revised estimate of Rs. 16,000 has been reduced to Rs. 15,400 and the reduced amount is recommended for sanction.

CHEPÂK,
26th February 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 3rd March 1891, No. 198 I., Public Works.

The following revised estimate, amounting to Rs. 15,400, for reconstructing the Vasudevan, Kattupakam and Pulvoy sluices in Uttramallur tank in the Chingleput division is sanctioned in supersession of the estimates, aggregating Rs. 9,230, sanctioned in G.O., No. 287 I., dated 29th March 1886:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Original Works.
Uttramallur tank, No. 537 of list of Imperial Works.

| | | RS. |
|---|---|---|
| Reconstructing | Vasudevan sluice ... ... ... ... ... | 7,600 |
| Do. | Kattupakam sluice ... ... ... ... ... | 4,100 |
| Do. | Pulvoy sluice ... ... ... ... ... ... | 3,700 |
| | Total, estimate ... | 15,400 |

2. This sanction has been registered as No. 146 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, V Circle, with six enclosures.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 3rd.*

*Recd.* *Encl.*

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**G.O., 3rd Mar. 1891, No. 198 I.**

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**MARCH.**

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**Sluices**

Revised estimate of Rs. 15,400 for reconstructing the Vasudevan, Kattupakam and Pulvoy — in Uttramallur tank, Chingleput division, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

No. 39 I.

*Note by the Chief Engineer for Irrigation.*

With his letter No. 2152 G.D., dated 13th instant, the Superintending Engineer, I Circle, submitted an application for modifications of allotments for works in the Godávari delta under "49. Major works (construction)" for the current year and a detailed statement of the works required to be carried out. In telegram No. 177, dated 20th instant, he applied for Rs. 7,000 in addition to Rs. 5,000 (not Rs. 4,000 as stated in the telegram), proposed for expenditure on the Vijeshweram lock in the application, besides the sum of Rs. 25,000 rendered available by writing back to "42. Major works (working expenses)" the value of the old lock at Vijeshweram. The Superintending Engineer proposed an allotment of Rs. 7,800 to meet the probable expenditure in England on account of a Priestman's dredger "A" size, indented for on the Secretary of State. As it is improbable that payment will be made for the dredger this year, Rs. 4,709 of the amount proposed for it may be allotted to the Vijeshweram lock, the remainder being required to meet establishment charges.

2. The Superintending Engineer's application has been altered accordingly and is submitted to Government for sanction. The allotments proposed in this application involve in several cases an excess over the sums provided for them in the schedules of works remaining to be carried out, printed in Proceedings of the Madras Government, No. 428 I., dated 11th August 1890, and sanctioned by the Government of India in its letter, printed with G.O., No. 664 I., dated 17th November 1890. The total excess is, however, nearly covered by savings. Revised schedules have been prepared in this office and will be sent to the Examiner of Public Works Accounts for verification; on their return they will be submitted to Government for sanction.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

CHEPÂK,
27th February 1891.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

## ENCLOSURE.

### APPLICATION for additional, or modification of, allotments in the Godávari Western division, I Circle.

| Financial budget and departmental head, &c. | Government Order in which sanctioned. Item number in budget. | Works. | Amount of estimate. | Outlay to end of previous year. | Original grant for current year. | Existing grant for current year. | PROPOSED. | | Amount at which grant for work will stand after reduction or increase. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Increase. | Reduction. | | |
| 49. Capital Expenditure on Public Works not charged against Revenue— | | GODAVARI WESTERN DIVISION. | RS. | RS. | RS. | RS. | RS. | RS. | RS. | |
| 2. Main canals and branches— | | *Main Canal.* | | | | | | | | |
| L. Earthwork .. | .. | Compensation for land .. .. .. | .. | .. | .. | .. | 342 | .. | 342 | |
| | | Improvements .. .. .. .. | 37,800 | 35,056 | .. | .. | 348 | .. | 348 | |
| | | Vijeshweram lock .. .. .. | 76,000 | .. | .. | .. | 34,709 | .. | 34,709 | |
| | | Deduct value of old lock charged to revenue account .. .. .. .. | .. | .. | .. | .. | −25,000 | .. | −25,000 | |
| | | Bobberlanka lock .. .. .. | .. | .. | .. | .. | 2,600 | .. | 2,600 | |
| 2. Main canals and branches— | | *Gannaram Canal.* | | | | | | | | |
| B. Land .. | .. | Compensation for land .. .. .. | 2,310 | 2,052 | .. | .. | 258 | .. | 258 | |
| I. Navigation | .. | Fender pile bridge at Rámachandrapuram surplus weir .. .. .. | 275 | 245 | .. | .. | 74 | .. | 74 | |
| 3. Distributaries— | | | | | | | | | | |
| B. Land .. | .. | Compensation for land .. .. .. | .. | .. | .. | .. | 305 | .. | 305 | |
| C. Works .. | .. | Minor masonry works .. .. .. | 17,273 | 15,087 | 800 | 600 | .. | 120 | 480 | |
| L. Earthwork | .. | Minor channels .. .. .. | 2,460 | 1,953 | .. | .. | 196 | .. | 196 | |
| 2. Main canals and branches— | | *Bank Canal.* | | | | | | | | |
| B. Land .. | .. | Compensation for land .. .. .. | 1,800 | 1,500 | 500 | 500 | .. | 200 | 300 | |
| 3. Distributaries— | | | | | | | | | | |
| B. Land .. | .. | Compensation for land .. .. .. | .. | .. | .. | .. | 2,418 | .. | 2,418 | |
| C. Works .. | .. | Minor masonry works .. .. .. | 7,505 | 6,844 | 1,500 | 600 | 110 | .. | 710 | |
| L. Earthwork | .. | Minor channels .. .. .. | 7,410 | 3,090 | 3,000 | 3,000 | 306 | .. | 3,306 | |
| 2. Main canals and branches— | | *Amalápuram Canal.* | | | | | | | | |
| B. Land .. | .. | Compensation for land .. .. .. | 120 | 238 | .. | .. | 54 | .. | 54 | |
| 3. Distributaries— | | | | | | | | | | |
| B. Land .. | .. | ........ | .. | .. | .. | .. | .. | .. | .. | |
| C. Works .. | .. | Minor masonry works .. .. .. | 11,827 | 8,422 | 1,500 | 1,200 | 493 | .. | 1,693 | |
| L. Earthwork | .. | Minor channels .. .. .. | 5,000 | 295 | 2,000 | 1,100 | .. | 55 | 1,045 | |
| 2. Main canals and branches— | | *Bendamurlanka Canal.* | | | | | | | | |
| B. Land .. | .. | Compensation for land .. .. .. | 120 | 239 | .. | .. | 120 | .. | 120 | |
| H. Escapes | .. | Surplus weir at 37 miles 2 chains .. .. | 1,300 | 338 | 1,200 | 1,200 | .. | 237 | 963 | |
| K. Buildings | .. | Inspection shed at Bendamurlanka .. | 1,000 | 28 | 1,000 | 1,000 | .. | 28 | 972 | |
| 3. Distributaries— C. Works .. | .. | Minor masonry works .. .. .. | 9,920 | 2,267 | 5,000 | 1,100 | .. | 76 | 1,024 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Venkiah and Wyeru Canal.* | | | | | | | | |
| 3. Distributaries—<br>C. Works .. | .. | Articulated pipe to take water from Annayakodu irrigation channel extension across Addala creek .. .. .. | 8,690 | 8,493 | .. | 650 | 91 | .. | 741 | |
| 4. Drainage and Productive Works— | | *Drainages.* | | | | | | | | |
| B. Land .. .. | .. | Compensation for land .. .. .. | .. | .. | .. | .. | 770 | .. | 770 | Required for excavating a channel from Ralli surplus weir to Gorinkala drain. |
| C. Works .. .. | .. | Inlet No. 2, Panchanadi drain .. .. | 1,290 | 1,287 | .. | .. | 66 | .. | 66 | |
| | | Do. No. 1 do. .. .. | 2,550 | 2,540 | .. | .. | 85 | .. | 85 | |
| L. Earthwork .. | .. | Kunavaram drain improvements .. .. | 20,820 | 20,716 | .. | .. | 10 | .. | 10 | |
| | | Total .. | .. | .. | .. | 10,950 | 18,355 | 716 | 28,589 | |
| 2. Main canals and branches— | | *Gannaram Canal.* | | | | | | | | |
| I. Navigation .. | .. | Gopálpur lock .. .. .. .. | 13,700 | 17,197 | .. | .. | .. | 570 | **— 570** | Works completed. Materials remaining after completion transferred to other works. |
| | .. | Sakhinetipalli lock .. .. .. | 31,200 | 29,596 | .. | .. | .. | 332 | **— 332** | |
| | | *Bendamurlanka Canal.* | | | | | | | | |
| | .. | Indupalli lock .. .. .. .. | .. | .. | .. | .. | .. | 509 | **— 509** | Work abandoned. Materials already collected transferred to other works. |
| | | Total .. | .. | .. | .. | 10,950 | 18,355 | 2,127 | 27,178 | |
| | .. | Tools and plant .. .. .. | .. | .. | .. | 20,000 | .. | 15,000 | 5,000 | |
| | .. | Establishment charges .. .. .. | .. | .. | .. | 2,403 | 2,797 | .. | 5,200 | |
| | .. | Reserve .. .. .. .. | .. | .. | .. | 4,025 | .. | 4,025 | .. | |
| | | Grand total .. | .. | .. | .. | 37,378 | 21,152 | 21,152 | 37,378 | |

(Signed) H. E. CLERK,
*for* Chief Engineer for Irrigation.

Order—dated 3rd March 1891, No. 200 I., Public Works.

The redistribution of the existing grant of Rs. 37,378 for the Godávari delta under "49. Major works (construction)" for the current year, as shown in the application attached to the foregoing note, is approved.

2. The following deferred telegram will be sent to the Superintending Engineer, I Circle :—

"Your telegram 177, 20th ultimo. Rs. 9,709 sanctioned for Vijeshweram lock besides Rs. 25,000 charged to Revenue account. No more funds available."

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 3rd.*

*Recd.* *Encl.*

**G.O., 3rd Mar. 1891, No. 200 I.**

**MARCH.**

## Godavari Delta

Approving the redistribution of the existing grant of Rs. 37,378 for the — under "49. Major works (construction)."

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

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### Irrigation.
### Account.

READ—the following paper :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated 31st December 1890, No. 433 GI.

I have the honor to forward, herewith, three completion reports for the works noted below and to request that sanction of Government may be obtained for meeting the excesses shown therein from the provisions for unforeseen works of the systems concerned :—

| — | Estimate. | Outlay. | Excess. | — |
|---|---|---|---|---|
| | RS. | RS. | RS. | |
| 1. Constructing lock at head of Bank canal at Yenamalakuduru in Kistna Eastern division .. .. .. | 17,195 | 18,859 | 1,664 | Kistna delta system. |
| 2. Constructing Assistant Engineer's quarters and out-houses at Bezváda .. .. .. .. .. | 5,400 | 6,710 | 1,310 | Kistna delta system. |
| 3. Varini tank—raising embankment .. .. .. | 3,700 | 3,768 | 68 | Sangam anicut system. |

2. The principal excess on item No. 1 is on the sub-head "excavating foundations and filling in," for which the provision made in the estimate was insufficient. The savings and excesses on other sub-heads will balance each other.

3. The principal excess on item No. 2 is on sub-heads "rough stone in chunam" and "teak-wood wrought and put up." The excess on the former is due to want of proper supervision and scrutiny of expenditure and on the latter the excess is due principally to an insufficient rate being allowed in the estimate.

4. The excess on the third item is trifling and can be passed.

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ORDER—dated 4th March 1891, No. 202 I., Public Works.

The Examiner of Public Works Accounts is authorized to pass the expenditure incurred on the works referred to in the foregoing letter from the Superintending Engineer, II Circle, the excess outlay in each case being met from the balances of the amount reserved for unforeseen works of the system concerned. The balances still available for unforeseen works of the Kistna delta and Sangam anicut systems are Rs. 2,94,608 and Rs. 17,706, respectively.

2. This sanction has been registered as No. 147 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with four enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 4th.*

*Recd.* *Encl.*

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**G.O., 4th Mar. 1891, No. 202 I.**

---

**MARCH.**

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**Excess Outlay**

The Examiner, Public Works Accounts, authorized to pass the — incurred on certain the works in II Circle.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 10th February 1891, No. 281 B.C.

I have the honor to forward, herewith, a plan, revised estimate, and comparative statement for the Pennér south flood-gate, for sanction.

2. The report accompanying the estimate with the note I have attached sufficiently explains the necessity for the revision.

ENCLOSURE.

REPORT to accompany revised estimate for Pennér south flood-gate. Amount of estimate, Rs. 24,100.

The site for this gate has been fixed, as shown on the survey, for the Pennér south diversion, sanctioned in G.O., No. 504 I., of 11th September 1890. A sketch skowing the selected site is herewith appended.

2. The original estimate sanctioned for this work with the canal completion estimates amounted to Rs. 26,500, item 34, section IV, northern canal (*vide* summary with Proceedings, Madras Government, No. 218 I., of 9th April 1890).

3. The design is of the usual type with additional protective work referred to by the Chief Engineer for Irrigation in his memo. No. II/15 B.C. of 2nd April 1887, but the necessity for the revision is principally due to the following :—

(*a*) This flood-gate was originally designed to a height of 15·50 from the lower floor, which is 5 feet below the lowest recorded tide 17·25 and 1·50 above the maximum flood level of previous years, viz., 26·25. Subsequent to that, the flood rose about 2·25′ above the then maximum flood level. To allow for this increased maximum flood level the design for the flood-gate has been revised accordingly.

(*b*) Changes of sub-heads 3 to 6 (in the comparative statement) from the original are due to the general sanction accorded (*vide* Superintending Engineer, V Circle, Nos. 2303 and 2775, dated 25th September 1882 and 5th November 1883, on the Chief Engineer, Public Works Department, No. 1707 C., dated 22nd September 1882, and the Chief Engineer for Irrigation No. 26 B.C., dated 29th October 1883, respectively). Subsequently this arrangement was slightly altered, to which sanction was accorded by Superintending Engineer, II Circle, No. 26 B.C. of 27th April 1889, and in accordance with which the flood-gate is estimated.

4. The sill of this gate is proposed to be on the same level as that of the north gate which was fixed with reference to lowest recorded tide, viz., 17·25 ; but for safety sake the bed of diversion above referred to was fixed 3 feet below assumed lowest level 16·00.

5. It is proposed to use for this flood-gate the gates that were prepared for the Palleru south flood-gate, but not found suitable for that gate in consequence of higher floods being recorded than they were designed for, their dimensions suit the proposed flood-gate.

6. The result of the additions and changes above noted and as stated in the comparative statement is to cause an excess of Rs. 3,600, which can be met from the reserve at the disposal of Government.

7. It is proposed to execute the work simultaneously with the diversion and both can now be proceeded with, as the stop bank across the head of the Patha Pennér has been completed.

8. The work will be carried out in accordance with the standard specification of the Madras Presidency.

(Signed) O. V. BODDY, Major, R.E.,
Executive Engineer, Buckingham Canal Division.

4th December 1890.

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No. 36 I.

Submitted to Government with a recommendation that the revised estimate of Rs. 24,100 be sanctioned.

(Signed) H. E. CLERK,
*for* Chief Engineer for Irrigation.

CHEPÂK,
26th February 1891.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 4th March 1891, No. 203 I., Public Works.

The following revised estimate, amounting to Rs. 24,100, for constructing the flood-gate, south bank of Pennér river, is sanctioned in lieu of the provision of Rs. 20,500 made for the work in the "summary of estimates," printed in Proceedings of the Madras Government No. 218 I., dated 9th April 1890, the excess of Rs. 3,600 being met from the amount reserved for unforeseen works of the Buckingham canal, which will then be reduced to Rs. 1,04,756:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which Capital and Revenue Accounts are kept.
Capital Account.
Buckingham Canal.
Northern Portion.
Section IV.
I. Works.
(2) Main Canals and Branches.
I. Navigation Works.

| | RS. |
|---|---|
| Constructing the flood-gate, south bank of Pennér river, estimate ... | 24,100 |

2. This sanction has been registered as No. 148 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with seven enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 4th.*

*Recd.* *Encl.*

G.O., 4th Mar. 1891, No. 203 I.

MARCH

**Flood-gate**

Revised estimate, amounting to Rupees 24,100, for constructing the —, south bank of Pennér river, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

Read—the following papers :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 1st December 1890, No. 2208 K.S.

I have the honor to submit, herewith, for your approval and sanction of Government, an estimate, amounting to Rs. 4,530, for improvements to Bhímavaram tank in the Kandukúr taluk of the Nellore district (Imperial No. 23).

2. The necessity for the work is explained in the report accompanying the estimate, which has been countersigned by the Collector.

3. The tank has an ayacut of 401 acres, and, when put into proper order, will bring an additional area of 30 acres belonging to Lutchirazupalem, a hamlet of Bhímavaram, under cultivation.

Memo. to the Superintending Engineer, II Circle, dated 5th December 1890, No. 67 N.L.

From H. H. O'CONNELL, Esq., Executive Engineer, Nellore division, to the Superintending Engineer, II Circle, dated 8th January 1891, No. 306.

[*Reference*—Your No. 528 N.L. of 23rd December 1890.]

In returning, herewith, the plans and estimates for the Bhímavaram tank, I have the honor to state that the F.T.L. and M.W.L. and the depth of water on crest of weir have been correctly stated in the hydraulic statement. The crest of weir is provided with wooden shutters, one foot high, which are to be put in after the heavy monsoon rains are over to maintain F.T.L. (*vide* plan of weir).

2. The specification has been completed in accordance with the remarks of the Chief Engineer for Irrigation.

No. 569 N.L.

Copy forwarded to the Chief Engineer for Irrigation with reference to his memo. No. II/67 N.L. of 5th December 1890, together with estimates, for information and sanction to the estimates.

(Signed) J. HANNAN,
Superintending Engineer, II Circle.

Bezvada,
21st January 1891.

No. 37 I.

Submitted to Government.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

Chepák,
26th February 1891.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 4th March 1891, No. 204 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Nellore Division.
Original Works.

| | RS. |
|---|---|
| Improvements to Bhímavaram tank, No. 23 of list of "Imperial works," estimate ... ... ... ... ... ... ... ... | 4,530 |

2. This sanction has been registered as No. 149 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' Table.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 4th.*

*Recd.* *Encl.*

**G.O., 4th Mar. 1891, No. 204 I.**

**MARCH.**

**Bhimavaram Tank, Nellore Division**

Estimate of Rs. 4,530 for improving the —, sanctioned.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.
### Account.

READ—the following paper:—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 27th January 1891, No. 2651 K.S.

I have the honor to forward, for sanction, a revised estimate and comparative statement for the work fitting screw-gearing shutters to the Sitanagaram under-sluices.

2. I enclose two letters in original from Mr. Jopp, the present Executive Engineer, explaining, as far as can be explained, the causes of the excess. No satisfactory explanation is forthcoming.

3. There is no doubt that the late foreman of the workshops wanted looking after, and that the cost of the work turned out by him was excessive as is evidenced by the considerable reduction in rates which has been effected by the present Division officer.

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No. 34 I.

Submitted to Government with a recommendation that the revised estimate of Rs. 16,400, as slightly raised in this office, be sanctioned.

2. In sanctioning the original estimate of Rs. 11,310 for the work, the amount required to meet the outlay was in this office memo. No. 93 K.S., dated 15th October 1888, met from the balance of Rs. 1,04,490 then available of the provision made in the delta completion estimates for raising the Kistna anicut at Bezváda. In the statement (*vide* item 13, printed in Proceedings of the Madras Government, No. 577 I., dated 1st October 1888), this sanction was overlooked, Rs. 1,04,490 and not Rs. 93,180, the correct balance, having been entered as the sum still available for raising the anicut. The saving effected on this provision and added to the amount reserved for unforeseen works of the Kistna delta in G.O., No. 15 I., dated 6th January 1891, being erroneously based on the former sum, viz., Rs. 1,04,490, the amount then shown to be available for unforeseen works is Rs. 11,310 more than what it ought to be. To rectify this error, it is suggested that the appropriation sanctioned in this office memorandum above quoted be ignored, the whole amount of the revised estimate being met from the existing balance for unforeseen works.

BEZVADA,
21st February 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 4th March 1891, No. 205 I., Public Works.

The following revised estimate, amounting to Rs. 16,400, is sanctioned in supersession of the estimate of Rs. 11,310 previously sanctioned, the whole amount of the

present estimate being met from the balance of the amount available for unforeseen works of the Kistna delta, which will then be reduced to Rs. 2,78,208 :—

Major Works (Construction).
49. Irrigation.
Kistna Delta System.
Eastern Section.
I. Works.
(1) Head Works.
C. Works.

| | RS. |
|---|---|
| Fixing shutters with screw gearing to the under-sluices at the Sitanagaram end of the Kistna anicut, estimate ... ... ... | 16,400 |

2. This sanction has been registered as No. 150 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with nine enclosures
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 4th.*

*Recd.* *Encl.*

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**G.O., 4th Mar. 1891, No. 205 I.**

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**MARCH.**

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**Kistna Anicut**

Revised estimate, amounting to Rs. 16,400, for fixing shutters with screw gearing to the under-sluices at the Sitanagaram end of the —, sanctioned.

GOVERNMENT OF MADRAS.

# PUBLIC WORKS DEPARTMENT.

## Irrigation.
## Account.

READ—the following papers:—

From the Superintending Engineer, II Circle, dated 22nd October 1890, No. 190 B.C.
To the „ „ II „ „ 29th „ „ „ 42 B.C.

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 27th January 1891, No. 266 B.C.

I have the honor to re-submit the plans and revised estimate, amounting to Rs. 21,500, for diversion to Buckingham canal from 67 miles 2 furlongs to 69 miles 3 furlongs at Dugarázpatnam, returned with your memo. No. II/42 B.C. of 29th October 1890, together with a copy of the Executive Engineer's letter No. 1434 of 19th January 1891, and to state that the estimate has been revised in accordance with the instructions given by you.

2. The net saving Rs. 34,070, as shown in the comparative statement, may be added to the balance available for unforeseen works of Buckingham canal.

ENCLOSURE.

REPORT to accompany revised estimate for diversion to canal 67 miles 2 furlongs to 69 miles 3 furlongs at Dugarázpatnam; amount of estimate Rs. 21,500.

This diversion was proposed originally to start from 65 miles 5 furlongs to south border of Dugarázpatnam river and from north border of the same river to 72 miles 2 furlongs with two flood gates at the river crossing, and the estimates for the same were sanctioned in project or completion estimate of Buckingham canal, items 15 and 17 in section II and items 1 and 2 in section III of northern canal, shown in G.O., No. 218 I., of 9th April 1890.

2. In the inspection notes, section III, para. 3 (1), of the Chief Engineer for Irrigation, embodied in G.O., No. 623, of 17th December 1889, these works were considered unnecessary and only a diversion from the north side of the river to 69 miles 2 furlongs was approved (*vide* section III, item 3, para. 1, of the above Government order). The diversion is accordingly proposed to be carried out from 67 miles 2 furlongs, commencing from the existing canal crossing the backwater and river to about 69 miles 3 furlongs, and also to lessen the heavy compensation of casuarina topes, &c., the line is altered slightly as shown on the survey. The length of diversion proposed will be 2 miles 2 furlongs and 400 feet, being carried in a curved line. Two cattle ramps will be made, one in mile 67/7 and the other in 69/1. The diversion has the standard section for cutting and banking, viz., 20 feet bottom with slopes 4 to 1 to tow-path level; tow-path 6′ wide and 1½′ above high spring tide level, sloping back with front slope 2 to 1; berms 6′ wide; where ground level is lower than tow-path level it is to be made up in accordance with instructions given in Chief Engineer for Irrigation's memo. No. II/42 B.C., dated 29th October 1890. The sole of canal will be the standard 3 feet below L.R.T. The banks will be of 6 feet top with slopes inside 2 to 1 and outside 3 to 1. The diversion from A to northern borders of the river will not require banking, as it runs through backwater, and that from the northern borders to B, as shown in longitudinal section, will be banked to full height 4 feet above H.F.L.; both sides and the remaining portion will be banked to full height only on east side and on west side to tow-path level only as the country above is protected sufficiently. The cutting slopes of canal will be turfed from L.R.T. level upwards, as also the berm slopes.

The bank inner slope will be turfed, outer slope planted. The saving on the revised estimate will be added to the reserve at the disposal of Government. The estimate also provides for throwing up a stop bank as shown on survey B.C.

(Signed) J. A. POWER, Captain,
Asst. Engineer, Buckingham Canal.

2nd January 1891.

(Signed) O. V. BODDY, Major, R.E.,
Executive Engineer, Buckingham Canal Division.

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No. 32 I.

Submitted to Government with a recommendation that the revised estimate of Rs. 21,500 be sanctioned.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

BEZVADA,
20th February 1891.

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ORDER—dated 4th March 1891, No. 206 I., Public Works.

The following revised estimate, amounting to Rs. 21,500, for diversion to the Buckingham canal from 67 miles 2 furlongs to 69 miles 3 furlongs at Dugarázpatnam, is sanctioned in lieu of the provision of Rs. 55,570 made for the work in the "summary of estimates," printed in Proceedings of the Madras Government, No. 218 I., dated 9th April 1890, the saving of Rs. 34,070 effected by the present estimate being added to the amount reserved for unforeseen works of the Buckingham canal, which will then be raised to Rs. 1,38,826:—

Irrigation.
43. Minor works and Navigation.
Irrigation and Navigation works for which Capital and Revenue Accounts are kept.
Capital Account.
Buckingham Canal.
Northern Portion—Section III.
I. Works.
(2) Main Canals and Branches.
L. Earthwork.

| | RS. |
|---|---|
| Diversion to canal from 67 miles 2 furlongs to 69 miles 3 furlongs, estimate ... ... ... ... ... ... ... ... | 21,500 |

2. This sanction has been registered as No. 151 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 4th.*

*Recd.* *Encl.*

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**G.O., 4th Mar. 1891, No. 206 I.**

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**MARCH.**

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**Buckingham Canal**

Revised estimate of Rs. 21,500 for diversion to the — from 67 miles 2 furlongs to 69 miles 3 furlongs at Dugarázpatnam, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

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**Irrigation.**
**Account.**

READ—the following papers :—

From H. S. TAYLOR, Esq., Superintendent of Works, No. I Periyár division, to the Chief Engineer, Public Works Department, dated Periyár, 14th February 1891, No. 433 S.E.

I have the honor to represent, for your consideration, the advisability of the early purchase of a second steam tug for use on the Muliya Panjan canal.

2. Each boat carries 10 tons of limestone and makes two trips a day in each of the reaches 1 and 2, 4 and 5. Four boats in each of these reaches will deliver the required 80 tons daily.

3. In No. 3 reach one boat can only make one trip a day and therefore eight boats are required. If a steamer is purchased, to ply to begin with in No. 3 reach, only three boats will be required, one loading, one unloading and one on the way, that is, a saving of five boats at Rs. 1,000 each or Rs. 5,000 towards the purchase of the steamer.

4. Boats have been or are being built to the number required without the steamer, but all the boats which would be set free will be required on the river for conveyance of firewood and sand.

5. Again, when No. I dam is submerged, it will be essential to have a second steamer, as in that position the only other method of propulsion would be by means of sweeps which would be extremely slow.

6. The work of supplying wood and sand in the river will at that time fully occupy the one steamer.

7. If, therefore, it is granted that a second steamer will eventually be required, it is obvious that it would be advisable to procure it at once to ply in the third reach and save boats.

8. A smaller and less expensive tug could, I think, be obtained than our present one. It would only be required to be capable of towing two 10-ton barges at a time. I think we could get a tug of that capacity for Rs. 6,000 at site, the saving of five boats being Rs. 5,000.

9. The canal will be in full working order, it is hoped, at the beginning of next season and it would be a great advantage to have the steamer here before the rains begin.

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*Note by the Chief Engineer, Public Works Department.*

After personal discussion of the subject with the Superintendent of Works, No. I Periyár division, the undersigned is of opinion that the purchase of a second steamer, somewhat smaller than the one now in use, will be economical.

2. In addition to the saving of a certain number of barges, there will be considerable saving in working expenses, as the cost of steam towage is very much less than that of propulsion by manual labor, whether by towing, poling or rowing.

3. It will not, however, be possible to obtain a suitable boat for quite so small a sum as the Rs. 6,000 mentioned by the Superintendent of Works. The present steamer cost £860 and the new one will probably cost about £600, or, say, Rs. 8,000 exclusive of freight and land carriage, or Rs. 10,000 including these charges.

4. It is recommended that sanction be given to the expenditure of this amount on the purchase of a second steamer.

5. If the estimate be sanctioned, the undersigned will prepare the necessary specification and indent.

(Signed) J. PENNYCUICK, Colonel, R.E.,
Chief Engineer, P.W.D.

27th February 1891.

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Order—dated 4th March 1891, No. 208 I., Public Works.

The purchase of a second steamer for use on the Periyár Project is sanctioned. An indent and specification will be prepared by the Chief Engineer, who will endeavour to keep the cost within the limits proposed in his note.

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintendent of Works, Periyár Project.
" Chief Engineer, Public Works Department.
" " for Irrigation.
" Examiner, Public Works Accounts.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 4th.*

*Read.* *Encl.*

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**G.O., 4th Mar. 1891, No. 208-I.**

---

**MARCH.**

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**Steamer**

The purchase of a second — for use on the Periyár Project, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

Read—the following paper :—

From the Assistant Chief Engineer for Irrigation in charge of Tank Restoration Scheme, to the Chief Engineer for Irrigation, dated 21st February 1891, No. 271 T.

I have the honor to submit for sanction an estimate in duplicate, amounting to Rs. 40, for scientific and mathematical instruments required for No. IV Party, Tank Restoration Scheme, and to request that you will be so good as to provide the necessary funds for meeting the cost from the budget grant of Rs. 1,000 provided for special tools and plant.

Order—dated 5th March 1891, No. 209 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation Works for which neither Capital nor Revenue Accounts are kept.
Tank Restoration Works.
III. Tools and Plant.
New supplies.

| | RS. |
|---|---|
| Purchasing scientific and mathematical instruments required for No. IV Tank Restoration Survey Party, estimate ... ... ... ... .. | 40 |

2. This sanction has been registered as No. 152 I. of 1890-91.

3. Rs. 40 are appropriated from the balance of the current year's budget grant of Rs. 1,000 for special tools and plant required for tank restoration works to cover the outlay now sanctioned.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation, with two enclosures.
" Examiner, Public Works Accounts.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 5th.*

*Recd.* *Encl.*

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**G.O., 5th Mar. 1891, No. 209 I.**

---

**MARCH.**

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**Instruments**

Estimate of Rs. 40 for purchasing scientific and mathematical — required for No. IV Tank Restoration Survey Party, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

---

**Irrigation.**
**Account.**

READ—the following papers :—

From H. S. TAYLOR, Esq., Superintendent of Works, No. I Periyár Division, to the Chief Engineer, Public Works Department, dated Periyár, 5th December 1890, No. 386 S.E.

With reference to your memorandum No. 5072 C., dated 6th instant, I have the honor to submit, for your approval and sanction, the enclosed estimate of Rs. 3,500 for conservancy establishment required for the current official year 1890-91.

2. The sum of Rs. 10,000 already sanctioned in G.O., No. 521 I., of 6th September 1888, for the conservancy establishment has been fully expended by the end of September last, and the present estimate is therefore necessary to cover the expenditure for the rest of the season, viz., 6 months, from October 1890 to March 1891 inclusive.

3. With regard to para. 5 of your memorandum under reply, I have to inform you that the population of Periyár has increased to 2,000 and of Thekady and the Tunnel to upwards of 600, and I find it very difficult to provide accommodation for the camps and the different works and keep them healthy even with the conservancy staff now provided for.

4. On cooly lines the sanctioned amount, viz., Rs. 7,500, has been fully expended and a fresh estimate for Rs. 2,500 has been sanctioned by me for the current official year.

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To the Superintendent of Works, No. I Periyár Division, dated 17th February 1891, No. 889 C.

From the Superintendent of Works, No. I Periyár Division, dated 2nd March 1891, No. 453 S.E.

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ORDER—dated 7th March 1891, No. 217 I., Public Works.

The following estimate is sanctioned, the amount required to cover the outlay being met from the available balance of the provision for P. Maintenance under (I) Head works, Periyár Project :—

Major Works (Construction).
49. Irrigation.
Periyár Project.
I. Works.
(1) Head Works.
K. Buildings.

| | RS. |
|---|---|
| Conservancy establishment required during 1890-91, estimate ... | 3,500 |

2. This sanction has been registered as No. 153 I. of 1890-91.

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintendent of Works, No. I Periyár Division, with two enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 7th.*

*Recd.* *Encl.*

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**G.O., 7th Mar. 1891, No. 217 I.**

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## MARCH.

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**Conservancy Establishment, Periyar Project**

Estimate of Rs. 3,500 for — required during 1890-91, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

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**Irrigation.**

READ—the following paper :—

*Inspection Notes of the Chief Engineer for Irrigation, 21st January to 7th February* 1891.

## RUSHIKULYA PROJECT.

1. RUSSELLKONDA RESERVOIR.

This has on the whole gone on slowly since its commencement in December 1884, but an improvement as regards speed has now been made and a very decided improvement as regards the method of carrying out the work is noticeable; indeed nothing could be better than the order into which Mr. deMorgan, with the assistance of his sub-division officer, Sub-Engineer Venkatareddi Naidu, has now got the work and all the operations connected with it. The progress of the work to end of December may be thus summarised :—

*Earthwork* about half the total quantity done.
*Puddle* about five-sevenths done.
*Revetment* about four-sevenths done.
*Coffer dam* for getting in puddle dyke at lead place almost completed.

The *coffer dam* and getting in the puddle trench in it across the bad place near the nalla has been finished except for about 50 feet in length, and as there remain but 35 vertical feet of well sinking to do, it is intended to push on with closing the gap across the nalla; there will be no difficulty in the puddle dyke across the nalla itself where clay underlies the surface at a very short distance down—of course the utmost care must be taken to join the puddle dyke here with that on both sides, and to enable that junction to be thoroughly made, the end (closing) wells of the coffer dam must be removed to *as low a level as possible.* The lead for the earth, which has to come from the flanks of the embankment, is now great and the earth has to be chiefly conveyed by means of a Decauville tramway; some short time ago the Executive Engineer applied for 100 more trucks for this tramway and the Superintending Engineer and myself having satisfied ourselves of the advisability of the supply it has been authorised. There are now besides the tramway about 400 carts conveying earth to the bank; they each do about 1½ cubic yards a day at a cost of about 5 annas per cubic yard.

The specification for *rough stone along the rear toe*, which, together with the cross rough stone drains under the rear slope, is intended to keep it well drained, was not very clear and instructions were given for a modification, which will reduce the quantity of stone in the rear drain from 36 to 21 cubic feet per foot run.

The excavation for the *head sluice* is nearly out and a considerable quantity of material has been collected. It is intended to push on with this work rapidly to floor level and to pass all the water which may have to be surplussed next season over this floor and so down the old channel with drops to the nalla; care must be taken that it *does* go that way and does not run down along the rear toe of the bank. Bricks for the head sluice are being prepared in accordance, as regards size, with a specification of Major Campbell, when Superintending Engineer of the Circle, and much trouble has

been taken to turn them out well, but they are not satisfactory, partly owing to a want of thorough "pugging" of the clay and partly to their being so thick (3") that with the kilns, or rather "clamps" available, they cannot be thoroughly burnt; the thickness will be reduced to $2\frac{1}{4}$ inches.

The *line for the channel from the head sluice to the nalla* was inspected and that suggested by the Executive Engineer approved with a slight alteration, the sites for the two drops were fixed subject to any alteration rendered necessary by what may prove to be the soil for foundations; instructions were given for the levels and general design of the drops.

The *line for the reservoir escape* was inspected and it was decided that all that will be necessary will be, as intended by Captain Beckley when he prepared the original estimates, a cut to F.T.L., 250 feet wide, through the ground near the road; where the road is cut through it should be paved and the approaches on either side properly sloped off and also paved to M.T.L.

From the "work register" it appears that the work generally is being done within estimated rates except as regards the "puddle dyke," for which by some mistake the utterly insufficient rate of Rs. 3 per 1,000 cubic feet was entered; it costs about Rs. 12 and the excess on this item will probably be about Rs. 14,000, but there will be considerable saving on "removal of top soil," "coffer dam," and "baling."

## 2. GOOMSUR ANICUT—SCOURING SLUICES—AND HEAD SLUICES.

The state to which these works have advanced may thus be summarised:—

*Head and under sluices* almost finished except lower apron of latter.

*Anicut.—Body wall* up to level + 183 (crest will be + 190) for 252 feet in length and wells for 198 feet further, ready; *front rough stone apron* laid for 200 feet; *first floor* (concrete) fully in for 276 feet; *first retaining wall* built for 288 feet and wells down for a further 143 feet; *rough stone apron* in for 160 feet in length for an approximate breadth of 25 feet; *wells for second retaining wall* in for 415 feet, except at a few gaps where wells were destroyed in floods of November 1889.

The character of the work done and the orderly and systematic way in which it is being carried out reflect great credit on Mr. Somers Eve, who has been in charge of this work and of the whole Mahanaddi canal for the last 18 months.

## 3. MAHANADDI CANAL.

The *earthwork* of this is about seven-eighths done and could, if wished, be finished off in two or three months. There is a great improvement in the manner in which the work is now being done.

The *Nimina cutting* has still over a short distance, where there is rock, to have about 6 feet taken out, but for the greater part of its length the soil in this cutting, instead of being rocky or hard, as expected, has proved soft and already slips have taken place; it seems certain therefore that it will not, if unprotected, in such places stand the velocity of 3 feet per second, which, by the alterations made in 1887 (see inspection notes of the Chief Engineer for Irrigation with Proceedings of the Madras Government No. 652 I., dated 22nd October 1887), there will be through the cutting, and an estimate should be prepared for, where necessary, pitching the slopes up to maximum water level. It seems also likely that the slopes will have to be cut back to not steeper than $1\frac{1}{2}$ to 1 and on the right side a berm of sufficient width between edge of cutting and spoil has not been left to allow of this sloping back without moving back some of the spoil; this would not have been the case had proper attention been paid to the orders given in September 1887 by the then Superintending Engineer, viz., that "the spoil be thrown no closer to the edge than as already arranged," that is, when the bottom width was to be 34 feet instead of 17 feet; additions now being made to front of the spoil heap to give it proper form should be stopped and the required form given by cutting *back* the spoil.

The only *masonry work* on this canal which is finished is aqueduct No. I in the first mile; the catch drain along back of right bank of canal to this work requires to be made of full section and to have the sides of its cutting sloped, especially on the side nearest the canal, or it will soon cut out right up to toe of the bank.

There has been considerable discussion as to the site for the second aqueduct provided for in the revised estimate near end of second mile; the nalla which has to be served has, owing to the small fall naturally available and the fact that it is bunded up at times for irrigation purposes, gone on raising its bed till it is positively higher than the land on either side of it which it ought to drain; the level at which the nalla crosses the canal is such that an "inlet and outlet" would be the easiest work to construct and would probably be the best for getting rid of the drainage; but this arrangement would involve an expensive "regulator" across the canal, which would have to be worked by a special establishment, to prevent the canal from being blocked up by sand and silt which the stream at times rolls down in great quantities; after careful consideration on the ground, the Superintending Engineer and myself agree that the best way will be to build an under-tunnel at a dip in the ground some 3/16th of a mile higher up the canal than the crossing of the stream, with a cut to and from it.

The third under-tunnel of the revised estimate at $2\frac{3}{4}$ mile is said to be required only for irrigation purposes and it will not be built unless surveys and levels show that there is a considerable area which would thus be thrown out of cultivation not being commanded by the canal.

It will be advisable to construct at about $2\frac{1}{4}$ or $2\frac{5}{16}$ miles, where the level of the ground is suitable, a flush inlet and outlet of 300 feet in length; the crest of these should not be brought to above the O.W.L. or 6 feet above bed, till the time comes when it may be necessary to have everything prepared for taking 8 feet depth down the canal; then the walls can be raised to M.W.L.

The fourth aqueduct of the revised estimate at $3\frac{3}{16}$ mile will have to pass the drainage of 20 square miles; its left side wall should be built up to only 6 feet above bed to allow of escape of surplus water which may pass down the canal from the inlet above. Grooved posts and boards will be provided on the escape wall to enable 8 feet depth to be passed down the canal when wished. The "towpath" of this, as of all similar works on this canal down to the Nimina cutting, will be on the right side and the coping should be of stone; 4 feet width will be enough; crossing the nallas above the canal will seldom be difficult for horses.

The next under-tunnel, known as No. 6, but really No. 5 of the revised estimate, at $4\frac{7}{16}$ miles, is almost finished; the work appears good and Mr. Somers Eve has paid great personal attention to its construction. No other masonry works on this canal have been commenced beyond the collection of some materials; the sites of all were visited and various matters were settled, or notes made to enable questions as they arise to be decided. The only one which needs special mention here is the question of the works required in connection with the canal as it approaches and crosses the Aska-Russellkonda road. The Superintending Engineer and myself looked into the matter on the ground with the Executive and Assistant Engineers and we decided that the arrangement should be that originally suggested by Captain Beckley, viz., a diversion of the nalla, the present bed of which will for some distance be occupied by the canal, to an under-tunnel to be constructed under the canal at about 11 miles and the provision of separate bridges over the canal and over the nalla diversion; towards the latter work the Local Fund ought to contribute, as the existing work over the nalla is insufficient in size and in a positively dangerous state of disrepair.

The site for the *terminal weir* was selected near the village road which will pass over it. Its crest will be 3 feet below O.W.L. with screw shutters of the general style found suitable for the lock weirs on the Godávari canals. From surface of ordinary water in the canal to bed of river is about 18 feet, but the drop is only 12 feet to crest of anicut to nearly which level the pond above it ought to be kept when any water is being sent on from this canal. To save the expense of very high wings, &c., the regulating weir with bridge over it will drop the water only 9 feet, the remainder of the drop being arranged for over a second wall across the channel some little distance down with its crest at + (170·3) 2 feet above the floor of the upper weir, so forming a water cushion for it, and with a lower floor at + 165·5 or 2 feet below crest of anicut.

The estimates, both original and revised, provide for only two "*accommodation bridges*" besides the Aska-Russellkonda road bridge on the whole length (19 miles) of this, Mahanaddi, canal, but with the greater knowledge now obtained of the requirements of the country it seems certain that others will be necessary, certainly one at about 16 miles, to carry the road between Nimina and Janamilly, and another between that and the Russellkonda road, probably at about $12\frac{1}{16}$ miles near the village of Nandijoli, will be required and estimates should be submitted for them. As it is pretty certain that navigation of this canal may for the present be put out of consideration, these bridges ("rolled" girders) need not give more than 5 feet head way above M.W.L., the abutment and piers, however, being so designed that they may be raised 6 feet if necessary hereafter. These recommendations affect *all* the bridges on this canal and no towpath need be provided for under any of them except along the left abutment of the Aska road bridge. These arrangements will considerably lessen the cost of the masonry work and approaches of the bridges.

## 4. Janamilly Anicut and Head Works.

The work done may be thus summarised:—

*Body wall* (crest to be + 167·5) is up to + 164·5 for whole length, which is now 700 feet instead of 600 feet as originally designed, the floods of November 1889 having shown the necessity for the extra length; portions of the body wall are founded on concrete on clay instead of on wells in sand as originally designed; the particulars of the changes in actual construction will be carefully noted and put on record. *Front rough stone apron* is up to same level as body wall for full length and 15 feet wide. *Rear apron retaining wall* is up to same level (only 1 foot below final) and for its whole length. *Rough stone apron between body wall and retaining wall* is nearly finished. *Rough stone apron below retaining wall*, 77 feet 6 inches broad, is nearly completed. *Talus*, 30 feet broad, not commenced. *Left flank wing and revetments and flood bank* connected with it, finished.

*Scouring sluices.*—Foundation on rock all ready to commence building.

*Head sluices.*—Most of the rock for these is out except for right vent and abutment. Every effort must be made to get these sluices ready, so that the bank across the canal may be removed and water sent down the canal to as far as the Shergedda cutting and supplied as wished for the first 10 miles of the canal in the coming cultivation season.

These Janamilly works, which are going on well, were under Mr. Medlicott till he went on leave in August 1890 and since then they have been placed under Mr. Somers Eve, whose charge now extends to just below the Shergedda cutting.

## 5. Rushikulya Canal.

*Reach from head to Ichápúr-Aska road at $12\frac{1}{2}$ miles.*—Up to 10 miles the earthwork and masonry works have for some considerable time been finished except bridges 1 and 4, under-tunnel No. 8, and the irrigation sluices required, of which one only has been built. It is intended next irrigation season to let water down to about $9\frac{3}{4}$ miles and to give it out of the canal as may be wished even if the arrangements with reference to the assessment of lands supplied or commanded be not completed.

*The Shergedda cutting, $10\frac{7}{16}$ to $11\frac{1}{2}$ miles.*—This was under Mr. Medlicott, with Overseer Swaminatha Aiyar, till August last; since then it has been under Mr. Somers Eve with the same overseer, of whom all the officers gave an excellent report. The work has progressed well and been executed in workmanlike style. Not nearly so much solid rock has been met with as anticipated except at $10\frac{1}{16}$ miles where there are still some 20 feet of solid rock (syenite) and at $11\frac{3}{8}$ miles, where there are about 12 feet to be got out. Elsewhere the most difficult soil met with has been disintegrating gneiss with boulders of the harder rock and consequently there should be a considerable saving on this portion. The state of work in this cutting may be thus summarised and there seems no reason why it should not be completed by the irrigation season of 1892-93.

$10\frac{1}{2}$ to $10\frac{21}{32}$ miles almost finished.
$10\frac{21}{32}$ ,, $10\frac{23}{32}$ ,, about 20 feet of solid rock to come out.
$10\frac{23}{32}$ ,, $10\frac{13}{16}$ ,, about 16 feet of earth and boulders to come out.
$10\frac{13}{16}$ ,, $10\frac{15}{16}$ ,, the deepest part of the cutting; there still remain some 10 feet of earth and boulders to take out.
$10\frac{15}{16}$ ,, $11\frac{11}{32}$ ,, from 5 to 6 feet of earth still to come out.
$11\frac{11}{32}$ ,, $11\frac{13}{32}$ ,, about 12 feet of rock to come out.
$11\frac{13}{32}$ ,, end almost finished.

*Reach from Ichápúr road to Godahallo aqueduct*, $12\frac{1}{2}$ to 18 *miles.—The bridge to carry the Ichápúr road* is about to be commenced on a diversion of the road, so that the bridge will not have to be on the skew.

Just beyond this bridge is *under-tunnel of two 9-feet vents, known as No.* 9, built some two years ago; it is cracked not far from inner toes of the banks which pass over it and it is evident that the great weight of those banks has either caused the soil under the foundations to compress somewhat and so cracked the work right through or has proved too much for the concrete arches (so called), which span the vents; a careful examination of the interior of the work of the side walls and floor can alone decide this and should be made; the result will affect the design for many other similar works on the canal. As regards this particular work it is said that, when it was discharging with water in the stream 5 feet above bed of canal, water came up freely through these cracks; clay banks should be put to allow of as great a depth of water as possible being put over the floor, and, if the cracks leak seriously, cutting them out and putting in fresh carefully-made concrete may be tried and the result reported on; it is so difficult to "cut out" any thickness of concrete without shaking all the contiguous concrete that it is very doubtful if the experiment will succeed, but there is plenty of time to make it in and it is worth trying.

The next *under-tunnel, known as No. 9-A, at* $13\frac{1}{4}$ *miles* to pass irrigation water, is cracked in many places, and, with only about a foot of head, water is passing up through the cracks and I fear it is too shattered to be repairable, at all events as regards its concrete "arch;" only a thorough examination of the interior will show whether the shattering is from the foundations or only in the concrete arch from its having been subjected to pressure of a head of water from below before the concrete was set. There can be no doult that masses of concrete even with "surki mortar" take a very long time to thoroughly set and that it is risky material to use for the arches of under-tunnels liable to have to discharge under a head only a few weeks or months after the concrete has been laid. Brickwork plastered with Portland cement would be safer to use and in future all aqueducts and under-tunnels, which have to discharge under a head, will be designed with such work for their arches instead of concrete. As regards this particular work, whether it will have to be dismantled and rebuilt, or only the arches removed and replaced by brickwork, will depend on the result of the examination.

These remarks apply also to the next *under-tunnel, known as No. 9-B, at* $14\frac{1}{4}$ *miles*, but it is just possible that the cracks seen are only in the plaster; this must be ascertained in the usual way by putting water over the work.

*Shergedda aqueduct, 9 spans of 15 feet, at* $14\frac{7}{16}$ *miles.*—This is up to springing and the centerings are in position; the necessity for certain additions and minor alterations to them was pointed out. It is intended to complete the work in this working season.

*Under-tunnel, known as No. 10, at* $15\frac{1}{4}$ *miles, built some two years ago.*—The remarks about under-tunnel No. 9 are all applicable to this.

*Under-tunnel, known as No. 10-A, at* $16\frac{1}{4}$ *miles*, built about nine months, has only just been plastered, so it cannot be seen if it is cracked; as soon as the plastering has set, the water tightness of the work must be tested in the usual way; these remarks are applicable also to the next *under-tunnel No. 11 at* $16\frac{1}{2}$ *miles.*

*Under-tunnel No. 12 at* $17\frac{1}{2}$ *miles*, built two years ago, but banks over added only this year; there are cracks in the plaster but apparently not through the concrete; water tightness must be tested.

*Godahallo aqueduct, 18 miles, 15 arches, 30-feet span.*—All foundations of this work to river floor level, except the top 8 inches of concrete, were got in last year and

the work is now to be raised to springing level, leaving the arches to be turned and work finished off next year.

No sample bricks for the arches are yet ready; every care should be taken to make and burn them well and they should be moulded to suit the radius of the arches which will not be turned in rings. It was settled with the Superintending Engineer to give an extra thickness to the arches at the haunches and that skew backs of cut "Gopálpur" stone should be provided. It is intended to make use of the Shergedda aqueduct centerings, 15 feet span, for these 30-feet arches; the Superintending Engineer must see that the design for this arrangement secures steadiness and rigidity. The supports at the sides had better be stone walls; in the centre they may be posts, properly braced and strutted, if there is a continuous beam of full span under each pair of the small centerings; if not, each of these centerings will require a broad support where they meet in the middle of the span. Mr. Medlicott suggests that a roadway, practicable except when the river is in flood, may be made under the southern arch with ramps down to it and this may be carried out. There has been an omission from the estimate of some of the rough stone aprons and it is said that since the estimate was prepared it has been found that the stone for "rubble" work cannot be got from the quarries near at hand and will cost considerably more than anticipated. A revised estimate will, therefore, be necessary and should be submitted.

The *earthwork* of this reach may be said to be almost finished and there has been a marked improvement in the way it has of late been done.

*Reach from the Godahallo to "drop" at 29⅝ miles, where the canal ceases to be navigable.*—Beyond the aqueduct the canal crosses Chinna Kimedi lands watered from the anicut across the Godahallo river about 3 miles above the aqueduct. The zemindar represents that the arrangement sanctioned for providing only one under-tunnel at $20\frac{1}{16}$ miles is not sufficient or suitable and that there should be a work to pass one of the branch channels at about $19\frac{1}{16}$ miles and that the work for passing the main or "Rajah-Komma" channel should be where that channel now crosses the line at $19\frac{15}{16}$ miles. I consider that the first part of his request should be complied with and the cost of the work will have to be met from the provision for unforeseen works; the second part of his request cannot be complied with because at the place the canal is in $5\frac{1}{2}$ feet cutting and an under-tunnel so deep down as this would necessitate would inevitably be constantly blocking up; where the work is proposed to be built, $20\frac{1}{16}$ miles, the level of the ground is much more favorable and a contour channel from the work will lead the water from it back to the present course of the "Rajah-Komma" channel not far below the canal. This arrangement, which is the best that can be suggested, will cut off 100 acres or so from their present source of supply; part of that area will be commanded by the canal but for such of it as will have to be converted from "wet" into "dry" compensation will possibly have to be paid. The zemindar also asks for a bridge at about $19\frac{3}{8}$ miles, but at that place the local officers say there is no road of any importance, nothing which may not be fairly well served by a ferry boat.

Beyond the aqueduct no masonry works have been commenced, but questions connected with several were gone into on the ground with the Superintending Engineer and the local officers and decisions arrived at or notes made which will enable them to be arrived at on the submission of the questions with further information than now available. There is of course a general squabble amongst the villages as to the sites for the few bridges (5 exclusive of the one for the Berhampore-Aska road) sanctioned for these 21 miles, but the sites can best be settled by the officers on the works from local knowledge and inquiries from the Revenue authorities.

*The "drop" at 39⅝ miles* should have a roadway 9 feet clear between the parapets over it; at about ¼ mile above this drop a "surplus sluice" to discharge 254 cubic feet per second should be built and it will also be advisable to provide a safety valve by making a "flush escape," 100 feet long at 6 feet above bed level, where the level of the ground is suitable, a short distance above the "drop."

Just above this drop the *Ichápúr distributary*, by far the largest connected with the project and to irrigate some 33,000 acres, is to take off, and for it the detail plans and

estimates should be prepared without delay; it will be well for the Executive Engineer to take this up himself as the sub-division officer has his hands very full with works actually under construction.

The *earthwork* in this reach is far advanced except in the 31st and 38th miles and the work bears every evidence of being carried out with system and attention to details. Care must be taken not to interfere with roadways and channels crossing the canal till absolutely necessary and where roadways have in cuttings been reduced to less than 15 feet width they are to be made up to that with side ridges and slopes 2 to 1.

*Reach from "drop" at* 39⅝ *miles to end at* 58⅜ *miles.*—The line has been laid out to 58¾ miles and the land acquired up to 56 miles or 1⅝ miles beyond the Berhampore-Chatrapur road. For the first 9 miles some *earthwork* has been done, but no *masonry* works have been commenced. It seems very doubtful if it will ever be worth while carrying on the canal beyond to 55 or 55½ miles and most certainly until the works, including the distributaries, have been completed and brought into operation up to the Chatrapur road, 54⅝ miles, nothing should be done beyond that.

**6.** ARRANGEMENTS FOR DISTRIBUTION.

The works of the main canals are now so far advanced that it is necessary that immediate attention should be paid to the *arrangements for distribution*; those for the Mahanaddi canal are now under consideration and were discussed with the Superintending Engineer and the local officers, but nothing has been done as regards those for the Rushikulya canal. The positions for the sluices and general lines for the chief distributaries were fixed in the original estimate, but subsequent extended knowledge of the country and requirements may extensively modify the arrangements then proposed and no detail estimates were ever prepared for the channels. From the head to 18 miles should be completely settled before dealing with any distributaries beyond that, except the "Ichápúr channel" above referred to.

**7.** THE STAFF.

The staff on this important project, the execution of which is surrounded by climatic and other difficulties, is working excellently. The officers are—

Mr. deMorgan, Executive Engineer in charge of the division;
Mr. Medlicott, " " " of Aska sub-division;
Mr. Somers Eve, Assistant Engineer in charge of Russellkonda sub-division;

and the subordinates who deserve special mention are—

Sub-Engineer W. Venkatareddi Naidu in charge of Russellkonda reservoir works;
Overseer S. A. Swaminatha Aiyar, Janamilly anicut and head works and Rushikulya canal to 12 miles.

BEZVADA,
21st February 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

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No. 33 I.

Submitted to Government.

BEZVADA,
21st February 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government, Public Works Department,
Irrigation Branch.

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ORDER—dated 7th March 1891, No. 218 I., Public Works.

Communicated to the Superintending Engineer, I Circle, for information and guidance.

2. Government notes with satisfaction the remarks of the Chief Engineer for Irrigation with reference to improvement in the execution of the works and to the excellent way in which the staff is working.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, I Circle.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 7th.*

*Recd.* *Encl.*

**G.O., 7th Mar. 1891, No. 218 I.**

**MARCH.**

## Rushikulya Project Works

Notes of inspection by the Chief Engineer for Irrigation of the —, communicated to the Superintending Engineer, I Circle, for information and guidance.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper:—

No. 45 I.

*Note by the Chief Engineer for Irrigation.*

With his letter, No. 507 G. L., dated 3rd February 1891, the Superintending Engineer, II Circle, has submitted an application for modifications of allotments involving an increase of Rs. 12,885 for the Kistna delta under 49. Major works (construction), a reduction of Rs. 1,200 for the Kistna delta under 42. Major works (working expenses), and a reduction of Rs. 17,718 under Provincial 43. Minor works and navigation. In reply to a reference made to him, the Superintending Engineer submitted with his letter, No. 3001 K.S., dated 27th February 1891, a revised application for modification of allotments for works in the Kistna Western division under 49. Major works (construction) involving an increase of only Rs. 585 for the whole delta. The Superintending Engineer suggests that the sum may be transferred from the grant for the Sangam anicut project under the same head, but it is recommended that the allotment proposed for widening the last three miles of the Budemeru in the Gudiváda division may be reduced from Rs. 2,000 to Rs. 1,524 so that the amount of reduction, together with the percentage charges for establishment, may render unnecessary the proposed transfer from the grant for the Sangam anicut project, as it is not desirable that so small an amount should now so late in the year be transferred from one project to another.

2. The surrender of Rs. 1,000 from the grant for tools and plant in the Kistna Western division under 42. Major works (working expenses) may be transferred to meet in part the demand of Rs. 2,500 for the Kistna Eastern division under the same head, made in the Superintending Engineer's No. 2832 K.S., dated 10th February 1891.

3. Under Provincial 43. Minor works and navigation, the Superintending Engineer has proposed to surrender Rs. 8,000 from the grant for the Buckingham canal capital account. He has been requested to arrange, if possible, for the amount being spent on the diversion south of the Pennér in addition to Rs. 3,530 which it was proposed to spend on that work; as, owing to the apprehended scarcity, due to scanty rainfall in the southern portion of the Nellore district, as much work as possible should be put in hand there. All the remaining modifications of allotments proposed by the Superintending Engineer under Provincial 43. Minor works and navigation in the application received with his letter, No. 507 G.L., dated 3rd February 1891, have already been dealt with in the following Government Orders:—

No. 116 I., dated 12th February 1891.
" 128 I., " 14th " "
" 136 I., " 16th " "
" 162 I., " 20th " "

4. In para. 3 of his letter, No. 3001 K.S., dated 27th February 1891, the Superintending Engineer reports a further surrender of Rs. 2,000 (viz., Rs. 1,000 under original works and Rs. 1,000 under repairs) from the grants for the Kistna Eastern division under irrigation and navigation works for which neither capital nor

revenue accounts are kept, and he explains that the surrender is due to scarcity of labor and the inexperience of the overseer lately posted to the charge of tank works in the division. The Superintending Engineer should have reported this surrender earlier, and it is now too late to arrange for the sum being utilized elsewhere. The surrender cannot therefore be accepted.

5. The modifications of allotments now requiring sanction are shown in the accompanying application received from the Superintending Engineer, duly altered in this office.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

Chepâk,
5th March 1891.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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Order—dated 7th March 1891, No. 219 I., Public Works.

The modifications of allotments recommended by the Chief Engineer for Irrigation are sanctioned.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 7th.*

*Recd.* *Encl.*

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**G.O., 7th Mar. 1891, No. 219 I.**

---

**MARCH.**

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**Modifications of Allotments**

Sanctioning certain — recommended by the Chief Engineer for Irrigation.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

No. 41 I.

*Note by the Chief Engineer for Irrigation.*

With his endorsement, No. 2051 G.D., dated 7th February 1891, the Superintending Engineer, I Circle, forwarded a communication, received from the Executive Engineer, Godávari Eastern division, surrendering Rs. 9,280 from the current year's grant for the division under 42. Major works (working expenses) tools and plant, Rs. 13,463 having been credited to that head towards the value of twelve canal iron punts transferred to the Kistna Eastern division. In his telegram, No. 178, of 21st February 1891, the Superintending Engineer reported a further surrender of Rs. 4,241, this sum having also been credited to the same head on account of the value of the punts. In telegram, No. 191, dated 1st March 1891, he reported that the value of the punts was originally charged to "Capital ordinary." This head of account corresponds * now to 49. Major works (construction) and not to 42. Major works (working expenses) as erroneously supposed by the Superintending Engineer. The value of the punts should, therefore, be credited to 49. Major works (construction). In his telegram, No. 75, dated 28th February 1891, the Superintending Engineer, II Circle, reports that Rs. 22,704 are required to meet the debit of the value of the punts to the Kistna Eastern division under 49. Major works (construction). The Superintending Engineer, I Circle, should have ascertained in the first instance the correct head of account to which the value of the punts should be credited, and the Superintending Engineer, II Circle, should have applied earlier for the necessary allotments of funds to meet the debit. The amount, Rs. 22,704, rendered available by the credit to the Godávari delta under 49. Major works (construction) may, it is suggested, be transferred to the Kistna delta to meet the charge under the same head.

* *Vide* G.O., No. 79 I., dated 12th February 1880.

2. In his telegrams noted in the margin, the Superintending Engineer, II Circle, reports that Rs. 5,000 are available from the grant for the Kistna Western division under 42. Major works (working expenses) extensions and improvements. Including establishment charge the amount available will be Rs. 6,150. Of this sum Rs. 1,500 are required to meet the balance of the demand of Rs. 2,500 for the Kistna Eastern division under tools and plant, repairs and carriage made in the Superintending Engineer's endorsement, No. 2832 K.S., dated 10th February 1891. Rs. 1,000 surrendered from the grant for the Kistna Western division under tools and plant have, in a separate note, been proposed to be transferred to the Kistna Eastern division. The balance of the surrender is, therefore, Rs. 4,650, and this sum may, it is suggested, be transferred to the Godávari Eastern division to meet in part the demands under tools and plant which the Executive Engineer of the division erroneously supposed could be met from the sum rendered available by the transfer of the punts to the Kistna Eastern division.

No. 75, dated 28th February 1891.
" 81, " 4th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

CHEPÂK,
5th March 1891.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 7th March 1891, No. 220 I., Public Works.

The value of the punts transferred from the Godávari Eastern division to the Kistna Eastern division will be credited to 49. Major works (construction).

2. The following transfers of funds are sanctioned :—

49. Major works (construction).

| From Godávari delta. | RS. | To Kistna delta. | RS. |
|---|---|---|---|
| Tools and plant, Eastern division ... | 22,704 | Tools and plant, Eastern division ... | 22,704 |

42. Major works (working expenses).

| Kistna delta. | | | |
|---|---|---|---|
| | | Kistna delta. | |
| Extensions and improvements— | | Tools and plant—Eastern division ... | 1,500 |
| Western division ... ... ... | 5,000 | Godávari delta. | |
| Establishment ... ... ... | 1,150 | Tools and plant, Eastern division ... | 4,650 |
| Total ... | 6,150 | Total ... | 6,150 |

3. The following deferred telegrams will be sent :—

*" To the Superintending Engineer, I Circle.*

" Your No. 2051 G.D., 7th ultimo, and telegram, 191, 1st instant. Capital ordinary included in 49. not 42. Rs. 22,704 should therefore be credited to 49. This sum transferred to Kistna. Rs. 4,650 allotted to Godávari Eastern under 42. tools and plant."

*" To the Superintending Engineer, II Circle.*

" Your telegram, 75, 28th ultimo. Rs. 22,704 sanctioned under 49. Rs. 5,000 available under 42. withdrawn."

4. The following urgent telegram will be sent to the Government of India :—

" Please note transfer Rs. 22,704 in current year's revised estimate under 49. from Godávari to Kistna and under 42. Rs. 4,650 from Kistna to Godávari and Rs. 1,230 from Cauvery to Barur."

5. Ordered that a copy of these Proceedings be forwarded to the Government of India for information.

(Here enter No. 221 I., dated 7th March 1891).

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle.
" " " II "
" " " IV "
" " " VI "
" Examiner, Public Works Accounts.

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ENDORSEMENT—dated 7th March 1891, No. 221 I., Public Works.

Forwarded.

(By Order.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 7th.*

*Recd.* *Encl.*

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**G.O., 7th Mar. 1891, Nos. 220 I., 221 I.**

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**MARCH.**

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**Transfers of Funds**

Forwarding copy of Proceedings sanctioning certain — under 49. Major works (construction).

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper :—

From Colonel H. SMALLEY, R.E., Superintending Engineer, III Circle, to the Chief Engineer for Irrigation, dated Bellary, 22nd January 1891, No. 3042.

With reference to para. 3 of your circular memorandum No. 14 G. of 4th April 1884, I have the honor to request that the following modification of allotment may be sanctioned under Provincial Irrigation and Navigation:—

43. Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.

| | Amount not required. RS. | | Amounts required. RS. |
|---|---|---|---|
| Major works— | | | |
| Bellary division— | | | |
| Singanamala tank ... ... | 2,500 | | |
| Tank Restoration Scheme— | | Major original works— | |
| Ráyalcheruvu tank ... ... | 2,000 | Bellary division— | |
| Minor original works ... ... | 100 | Improving Yellari tank ... ... | 2,000 |
| Repairs ... ... ... ... | 2,000 | Do. Anantapur tank ... | 2,000 |
| Kurnool division— | | Cuddapah division— | |
| Ordinary minor original works... | 1,000 | Agricultural works— | |
| Bellary division— | | Repairs— | |
| Irrigation Cess fund ... ... | 8,000 | River conservancy ... ... | 1,500 |

2. Owing to scarcity of labor and materials on account of railway competition, the full amount of grant cannot be spent on Singanamala and Ráyalcheruvu tanks and hence the present surrender.

3. Most of the Tank Restoration Scheme minor works sanctioned by the Chief Engineer are nearly completed and the amounts provided for the petty supervision and contingencies will remain unspent, thus effecting a saving of Rs. 100, which is, therefore, now surrendered. The sum of Rs. 2,000 under Tank Restoration Scheme repairs in the Bellary division is not required, as there is water in some of the tanks and the works, therefore, cannot be pushed on, and Rs. 1,000 is also not required under Ordinary Irrigation minor original works in the Kurnool division owing to estimates not being sanctioned under this head.

4. Rupees 8,000 is surrendered by the Executive Engineer, Bellary division, under the Irrigation Cess fund, as there are no estimates and the requirements of the channels have to be carefully ascertained and estimated for. It is also not yet decided as to what items should be charged to Cess fund in the estimate, amounting to Rs. 37,100, that will be submitted shortly for the improvements of the Roya channel.

5. The sum of Rs. 2,000 on the improvements of the Yellari tank and Rs. 2,000 for Anantapur tank in the Bellary division and Rs. 1,500 in the Cuddapah division against Agricultural works—River conservancy—Repairs can be spent during this official year.

6. This letter settles all the points raised by the Chief Engineer in his letter No. III/2 B.L., dated 6th January 1891, against the E-form progress report of the Bellary division for November 1890.

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ORDER—dated 7th March 1891, No. 222 I., Public Works.

The following transfers of funds are sanctioned :—

Provincial.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.

| *From* | RS. | *To* | RS. |
|---|---|---|---|
| Kurnool— | | Bellary division— | |
| Minor original works ... ... | 1,000 | Yellari tank ... ... ... | 1,500 |
| Bellary— | | Anantapur tank ... ... ... | 2,000 |
| Singanamala tank ... | 2,500 | | |
| Total ... | 3,500 | Total ... | 3,500 |

There are no funds available either to meet the balance of the demand for the Yellari tank or the demand of Rs. 1,500 for the Cuddapah division under Agricultural—River conservancy—Repairs. The surrenders from the grants for items 2, 3 and 4 aggregate Rs. 4,100 and this sum is held in reserve to meet the demands for other divisions.

2. The amount of Rs. 8,000 surrendered from the Irrigation Cess fund grant will be relinquished to the Revenue Department. The Superintending Engineer will expedite the submission of the explanation already called for by the Chief Engineer for Irrigation as regards delay in preparing estimates for the Tungabadra channels.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, III Circle.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 7th.*

*Recd.* *Encl.*

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**G.O., 7th Mar. 1891, No. 222 I.**

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**MARCH.**

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**Transfers of Funds**

Sanctioning certain —

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

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### Irrigation.

READ—the following papers :—

From Major D. McN. CAMPBELL, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 5th March 1891, No. 81 E.I.

As requested by the Executive Engineer, Negapatam division, in his letter No. 490, dated 25th February last, I have the honor to surrender Rs. 2,200, being the existing allotment for Corayar straight cut at Nídámangalam under Agricultural River Conservancy Original Works, Major.

2. The Executive Engineer reports that it is not likely that the land required for the work will be handed over to this department before the end of March 1891. Hence the surrender.

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From Major D. McN. CAMPBELL, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 5th March 1891, No. 82 E.I.

With reference to the latter part of para. 3 of G.O., No. 116 I., dated 12th February last, I have the honor to request that an additional allotment of Rs. 3,000 may be sanctioned under Agricultural Original Works, Major, for the Náráyanavaram river diversion and embankment works at Ponnéri.

2. I also request that a grant of Rs. 4,000 may be sanctioned under Ordinary Repairs, Irrigation, for the Kadur and Kambakam relief works in Tiruvallúr taluk.

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ORDER—dated 7th March 1891, No. 224 I., Public Works.

The grant of Rs. 2,200 for Corayar straight cut in the Negapatam division, surrendered by the Superintending Engineer in his letter No. 81 E.I., is transferred to meet in part the demand of Rs. 3,000 for the Náráyanavaram river diversion in the Chingleput district, and the balance of the demand, viz., Rs. 800, is appropriated from the reserve under "Agricultural" Original Works.

2. The sum of Rs. 4,000 required for the relief works in the Tiruvallúr taluk of the Chingleput district under "Ordinary Irrigation Works," "Repairs," is appropriated by transfer, Rs. 1,000 from the grant for minor original works and Rs. 3,000 from that for repairs in the Salem district, the Superintending Engineer, IV Circle, having surrendered Rs. 1,400 from the former and Rs. 3,000 from the latter grant.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To Superintending Engineers, IV and V Circles.
To the Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 7th.*

*Recd.* *Encl.*

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**G.O., 7th Mar. 1891, No. 224 I.**

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**MARCH.**

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## Appropriations

Appropriating funds for certain works in the Chingleput district.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.
### Account.

READ—the following papers:—

From Colonel H. SMALLEY, R.E., Superintending Engineer, III Circle, to the Chief Engineer for Irrigation, dated Bellary, 28th January 1891, No. 3097.

I have the honor to forward, for sanction of Government, plans and estimates, amounting to Rs. 37,100, for the improvement of the Roya channel prepared by the present Executive Engineer of Bellary division, Mr. Larminie.

2. Following the principles on which the charges due to "Provincial" and to the "Irrigation Cess fund" have been made in the case of the Bella channel improvements estimate, sanctioned in G.O., dated 27th August 1890, No. 461 I., it would seem proper that the following items of the present estimate should be charged to "Provincial," viz., everything, except—

| | RS. |
|---|---|
| (1) Repairing and improving and regulating existing irrigation sluices ... | 3,915 |
| (2) Repairing and improving and regulating existing irrigation sluices (plug hole design) ... | 660 |
| (3) Pot sluices in lieu of existing sluices ... | 950 |
| (4) Sluice in lieu of existing sluice ... | 530 |
| Total ... | 6,055 |

According to this classification, therefore, Rs. 31,045 would have to be met from "Provincial" and Rs. 6,055 from the "Irrigation Cess fund."

3. If this estimate be sanctioned as it stands, there would be altogether about Rs. 60,000 sanctioned for the improvement of the Tungabhadra channels up to date, of which the ryots are asked to contribute little more than Rs. 10,000. At this rate it would seem that their share for the whole of the channels, when estimates for their improvements have been got out, would not amount to more than Rs. 35,000, which is the sum I understand already collected from them under the head of "irrigation cess" up to date. It would seem expedient, therefore, to stop all further collections under this head until at least all the estimates are ready.

4. As to the present estimate, I concur in the Executive Engineer's views which have been carefully considered. An aqueduct across the Mukarti nulla near the head of the Roya channel is most desirable, the channel at present making a long detour in order to cross through the nulla at the requisite level.

5. I regret the delay in submitting this estimate, which is due to change of officers and subordinates and to the vast area of the Bellary division.

6. The Executive Engineer will be called on to state what funds he can spend on this estimate under Provincial and Irrigation Cess, respectively, both in 1890-91 and 1891-92, which will be reported to you hereafter. Meantime he will be authorized to commence work in the present working season in anticipation of sanction to the estimate and provision of funds.

---

No. 43 I.

*Note by the Chief Engineer for Irrigation.*

The estimates, amounting to Rs. 37,300, are submitted for sanction as received from the Superintending Engineer. It is important that work should be at once started on the channel and it is not considered advisable to delay sanction in order to make the modifications in the plans, &c., which would otherwise have been carried out before recommending them for sanction.

2. The following points, however, should receive the attention of the Superintending Engineer and he should make such alterations as may be necessary before the works are commenced:—

(a) It does not appear that any systematic attempt has been made to reduce the sizes of the vents of the distribution sluices to those which are required by the areas which the sluices supply.

(b) In the design for the aqueduct in the diversion between 1 mile 2 furlongs and 2 miles 3 furlongs, it will be necessary to increase the thickness of piers, abutments and wings, and the Superintending Engineer should see that a revised plan is prepared before the actual construction is commenced.

(c) The new sluice to replace sluice No. 52 might very well be an iron pipe, as the area irrigated by it is only 60 acres.

(d) Iron pipe sluices would not cost much more and would be much more durable than the five pot sluices, which it is proposed to build instead of existing sluices Nos. 42, 43, 46, 53 and 54.

3. The following works should be charged to Provincial and the remainder to Irrigation Cess fund:—

| Number in general abstract. | Name of work. |
|---|---|
| 1. | Repairing anicut and bringing its crest to one uniform level. |
| 2. | Improving the existing head sluice of Roya channel. |
| 7. | Repairs to bridge No. 1 at 2 miles 7 furlongs. |
| 9. | ,, to ,, ,, 3 at 4 ,, 4 ,, |
| 12. | ,, to ,, ,, 5 at 5 ,, 6 ,, |
| 13. | ,, to ,, ,, 6 at 7 ,, 1 furlong. |
| 14. | ,, to ,, ,, 7 at 7 ,, 6 furlongs. |
| 15. | ,, to ,, ,, 8 at 8 ,, 6 ,, |
| 19. | ,, to ,, ,, 9 at 11 ,, 1 furlong. |
| 20. | ,, to ,, ,, 10 at 12 ,, 1 ,, |

CHEPÂK,
3rd March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 9th March 1891, No. 225 I., Public Works.

The estimates, amounting to Rs. 37,300, for improving the Roya channel in the Bellary division, are sanctioned, Rs. 3,194 being chargeable to Provincial funds and Rs. 34,106 to the "Local Irrigation Cess fund" as shown below:—

Provincial.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Major Original Works.
Roya Channel Improvements.

| | | RS. |
|---|---|---|
| 1. | Repairing anicut and bringing its crest to one uniform level ... | 1,090 |
| 2. | Improving and providing screw-gearing shutter for the existing head sluice of Roya channel ... ... ... ... .. | 1,660 |
| 3. | Repairing bridge No. 1 at 2 miles 7 furlongs ... ... ... | 56 |
| 4. | ,, ,, ,, 3 at 4 ,, 4 ,, ... ... ... | 48 |
| 5. | ,, ,, ,, 5 at 5 ,, 6 ,, ... ... ... | 95 |
| 6. | ,, ,, ,, 6 at 7 ,, 1 furlong ... ... ... | 16 |
| 7. | ,, ,, ,, 7 at 7 ,, 6 furlongs ... ... ... | 67 |
| 8. | ,, ,, ,, 8 at 8 ,, 6 ,, ... ... ... | 69 |
| 9. | ,, ,, ,, 9 at 11 ,, 1 furlong ... ... ... | 37 |
| 10. | ,, ,, ,, 10 at 12 ,, 1 ,, ... ... ... | 56 |
| | Total ... | 3,194 |

Local Irrigation Cess Fund.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Major Original Works.
Roya Channel Improvements.

| | RS. |
|---|---|
| 1. Repairing aqueduct No. 1 in 0 miles 1 furlong ... ... ... | 105 |
| 2. Surplus escape „ 1 in 0 „ 3 furlongs ... ... | 24 |
| 3. Improving surplus weir No. 2 at 1 mile 1 furlong ... ... | 38 |
| 4. Constructing an aqueduct at 1 mile 2 furlongs over the Mukarti odai ... ... ... ... ... ... ... ... | 6,400 |
| 5. Diversion of channel through proposed aqueduct across Mukarti nulla between miles ½ and ⅔ ... ... ... ... ... | 1,005 |
| 6. Improving surplus sluice and providing screw-gearing shutter to surplus sluice Nos. 1 and 3 ... ... ... ... ... | 880 |
| 7. Improving surplus weir at 4 miles 7 furlongs ... ... ... | 100 |
| 8. Repairing aqueduct No. 3 in 5 miles 5 furlongs by a new cast iron aqueduct on masonry pillars ... ... ... ... | 200 |
| 9. Improving surplus escape at 9 miles 2 furlongs ... ... | 55 |
| 10. „ „ at 9 „ 7 „ ... ... | 54 |
| 11. „ „ at 11 „ 1 furlong ... ... | 257 |
| 12. „ surplus weir at 13 „ 2 furlongs ... ... | 70 |
| 13. Repairing existing dam at 13 „ 7 „ ... ... | 60 |
| 14. Constructing an irrigation sluice in lieu of existing sluice No. 52 in 15 miles 5 furlongs ... ... ... ... ... ... | 530 |
| 15. Improving surplus weir at 16 miles 7 furlongs ... ... ... | 253 |
| 16. Forming surplus weir at 4 furlongs 19 miles of Roya channel ... | 310 |
| 17. Improving and enlarging sectional area of channel ... ... | 13,618 |
| 18. Removing trees and brushwood obstructing waterway ... | 220 |
| 19. Five pot sluices proposed in lieu of existing sluices Nos. 42, 43, 46, 53 and 54 of Roya channel ... ... ... ... | 950 |
| 20. Repairing and providing proper regulation to existing irrigation sluices, plug hole design No. 10 ... ... ... ... | 660 |
| 21. Repairing and providing proper regulation to existing irrigation sluices, ordinary design ... ... ... ... ... | 3,915 |
| 22. Stone pitching to inner left slope of channel ... ... ... | 3,192 |
| 23. Blasting and removing boulders in bed of channel ... ... | 1,210 |
| Total ... | 34,106 |

2. The sanction from Provincial funds is registered as No. 154 I. of 1890-91 and that from Local Irrigation Cess fund as No. 155 I. of 1890-91.

3. The special attention of the Superintending Engineer will be given to the remarks of the Chief Engineer for Irrigation in para. 2 of his "note."

4. In G.O., No. 461 I., dated 27th August 1890, sanctioning the estimates for improving the Bella channel, items 4, 7, 8, 9 and 13 under Provincial, aggregating Rs. 3,194, were erroneously entered as chargeable to that head. They will now be transferred to "Irrigation Cess fund," to which they should be charged; they will be registered as items 33, 34, 35, 36 and 37, respectively.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, III Circle, with fifty-eight enclosures.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 9th.*

*Recd.* *Encl.*

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**G.O., 9th Mar. 1891, No. 225 I.**

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## MARCH.

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**Roya Channel, Bellary Division**

Estimates, amounting to Rs. 37,300, for improving the —, sanctioned.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

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**Irrigation.**
**Account.**

READ—the following papers :—

From M. HAMMICK, Esq., Acting Collector of the Chingleput district, to the Chief Engineer for Irrigation, dated Saidápet, 29th November 1890, Reference on No. 3381-Eng.

It was brought to the notice of Mr. Lee-Warner in 1888 that the supply channel from the Tenneri tank to the Audithangal in No. 388, Tonankulam village, Conjeeveram taluk, was very much out of order and was cut up at various places, so that the latter work did not receive a fair supply of water. The ryots of two other adjacent villages also complained that the supply to their tanks was also inadequate in consequence. It was, therefore, proposed to construct a calingula across the Tenneri madugu, so as to meet the wants of the surrounding villagers. Mr. Lee-Warner was of opinion that, as the Tenneri tank was an Imperial work, a calingula across a channel leading from that work should be constructed at the cost of the Public Works Department. The Executive Engineer was asked to execute the work and he now forwards a plan and estimate for Rs. 4,800 and states that the Superintending Engineer is of opinion that the work can be carried out by the Public Works Department provided you do not object to the same being done. Under the circumstances, I herewith submit the plan and estimate for the sanction of Government and request that you will be so good as to communicate its orders at an early date.

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To the Collector of the Chingleput district, dated 4th December 1890, No. 45 C.N.

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From Major D. McN. CAMPBELL, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 28th January 1891, No. 29 E.I.

With his letter No. 3381, dated 28th November 1890, the Acting Collector of Chingleput submitted to you an estimate for constructing a calingula across Tenneri madugu. You returned it with your No. 45 C.N., dated 4th December 1890, in which you required further information and you requested that it should be sent through me. I have therefore now the honor to resubmit it, the information required having been given. You will see that the area now irrigated by the earthen bank is 1,102 and that the further area that can be irrigated by the calingula is 1,240. The total area will, therefore, be acres 2,342 ; this is a considerable amount and I think the work should be done from funds provided by this department. The calingula is to be built across the surplus from an Imperial tank, but the surplus itself is not classed as Imperial.

---

REPORT to accompany estimate for constructing a calingula across surplus channel of Tenneri tank in the Conjeeveram taluk. Estimate amount Rs. 4,800.

The object of this work to retain is water in the channel for the purpose of irrigation by channels on right bank.

A rough sketch is herewith, illustrating the existing earthen dams ; as to the position they occupy it will be seen that the upper one is just above an inlet channel, bringing in the drainage and waste water from a considerable area of fields under Tenneri tank. This is too important a supply to be relinquished, therefore it is proposed to construct the calingula just below it.

A calingula is proposed in preference to a weir with vents, since the latter would obstruct the waterway too much during the time the Tenneri tank is surplusing even if the vent shutters are removed in time, which it is probable they would not be since the site is remote from.

any village. By any blockage of the waterway the immense surplus would prove destructive to the channel and inflict much damage to fields on both banks; moreover, the shutters will be frequently carried away and require renewal. With the earthen dams now existing there is much proof that they have been retained till too late a period and thereby much damage has been done to the surplus and irrigation channels.

The channel is full of springs, hence much water will be met with, so that it is feared concrete laying will not be possible; hence dressed laterite in surki mortar as personally explained to, and approved by, the Executive Engineer is proposed instead.

No embankment is proposed since the banks on either side are fairly level, over which any excess surplus not containable in the channel would pass harmlessly away.

The apron has been designed to receive an overfall over the dam stones, it being assumed that, with any head, the turf between dam stones would not stand long, but would soon be washed out and afford relief; but I consider that it should be compulsory for such clearance to be made on or before October 15th of each year.

All items of work to be carried out in accordance with paragraphs of the standard specifications referring thereto.

Data are herewith furnished for rates in excess of schedule rates.

A lump sum provision for baling has been made.

10th October 1890. (Signed) J. B. SANDERSON,
Sub-Divisional officer.

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No. 40 I.

Submitted to Government.

2. It is recommended that the surplus channel of the Tenneri tank be brought on the list of "Imperial" works of the Chingleput district as No. 292 A.

CHEPÂK,
4th March 1891.
(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 9th March 1891, No. 226 I., Public Works.

The following estimate is sanctioned:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Chingleput Division.
Original Works.

| | RS. |
|---|---|
| Constructing a calingula across the surplus channel of the Tenneri tank, estimate ... ... ... ... ... .. ... | 4,800 |

2. This sanction has been registered as No. 156 I. of 1890-91.

3. The recommendation made in para. 2 of the foregoing endorsement of the Chief Engineer for Irrigation is approved.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle, with four enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' Table.

IRRIGATION.
ACCOUNT.

# Govt. of (1891) Madras.

## PUBLIC WORKS.

*Dated March, 9th.*

*Recd.* *Encl.*

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**G.O., 9th Mar. 1891, No. 226 I.**

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**MARCH.**

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**Surplus Channel of the Tenneri Tank, Chingleput Division**

Estimate of Rs. 4,800 for constructing a calingula across the —, sanctioned.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.
### Account.

READ—the following papers:—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 3rd February 1891, No. 2724 K.S.

I have the honor to forward herewith for your sanction an estimate for the Potumeraka channel which will take off from the right bank of the Bank canal, Western delta, at 37 miles 2 furlongs 290 feet (general mileage).

2. This estimate is in supersession of the project estimate for this channel and also of the Vizeshweram channel which it is now proposed to make a branch of the Potumeraka channel.

3. The necessity for this arrangement is due to the substitution of one lock at Mortota at $37\frac{1}{2}$ miles, sanctioned in G.O., No. 778 I., of 9th December 1887, in lieu of the two locks sanctioned in the project, viz., one at Penumudi at $33\frac{1}{2}$ miles and the other at Bobberlanka at 39 miles. This necessitates the head of the existing Vizeshweram channel, which is now below the Mortota lock, being taken off above it, and as the Potumeraka channel head has also to be taken off here, one head sluice answers for both—please see tracing from taluk map with the report attached to the estimate for the channel.

4. The provision made in the project for both these channels is Rs. 9,825—see items 907, 908, 930, 931, 947 and 948 in revised statement of sanctioned estimates printed with G.O., No. 577 I., of 1st October 1888. The amount of the estimate now submitted is Rs. 7,890. The difference Rs. 1,935 can be credited to the provision for unforeseen works.

5. The area commanded by this channel and its branches is about 9 square miles as defined in report attached to estimate or 9 × 640 = 5,760 acres, out of which the Division officer is of opinion that only 4,000 is irrigable, the rest being swamp or otherwise unsuitable. Provision has accordingly been made for irrigating only 4,000 acres, 1,600 of which is already irrigated.

6. Major Campbell allows for 9,500 acres being irrigated by these two channels, Potumeraka and Vizeshweram (see para. 4 of his specification for Bank canal printed with G.O., No. 3572, of 19th December 1874); but, as the area of the block to be irrigated as pointed out above is only 5,760 acres, he must have over-estimated.

7. The irrigable area commanded by this canal appears to have been over-estimated generally; and this question is now being gone into carefully by the Division officer, and the necessary proposals for modifying the areas will be submitted for your approval.

ENCLOSURES.

REPORT to accompany the estimate for excavating Potumeraka channel, amount of estimate Rs. 7,890.

*Area to be irrigated.*—The Potumeraka channel will take off from Bank canal at 37 miles 2 furlongs and 290 feet, and will, with its branch channels, irrigate the block of land bounded on the north by the Nallur and Mortota tanks, on the west by Batteprole drain, on the south by

No. 1 irrigation channel, and on east by Bank canal an irrigable area of 4,000 acres. About 1,600 acres of this area is already under irrigation by means of Mortota Para and Vizeshweram channels and palmyra spouts in right bank of canal. It is proposed to convert the two former channels into branches of Potumeraka channel and to remove all the palmyra spouts, the main channel being taken immediately in rear of the canal bank.

*Head sluice.*—The head sluice will have 2 vents each $2\frac{3}{4}' \times 2\frac{1}{2}'$ and will be built of random rubble masonry with carefully selected face stones neatly pointed with Surki mortar. The bed level of the channel being + 7·60 and the sluice sill + 9·32, there will be a drop of 1·72 feet in rear. There will thus be considerable velocity, and more protection from erosion than is usually allowed in rear of sluices has been provided for in this design.

*Channel and its branches.*—The Mortota Para branch channel (irrigating 700 acres) will take off immediately in rear of the head sluice, so the main channel will only require to be of sufficient dimensions to supply 3,300 acres, for which a discharge of 60 cubic feet per second is required, with depth of water 3 feet, bedfall 9″ per mile, a bottom width of 14 feet will be required from head to Vizeshweram channel (3 furlongs 340 feet). From this point a bottom width of 11 feet will suffice up to 2 miles 275 feet. Here the main channel will leave the canal bank and diverge to the west, a branch being continued along rear of canal bank to Sodaipalem village and terminating in No. 1 irrigation channel. The bed width of the main or western branch will be 6 feet with bedfall of 1·25 per mile, and of the Sodaipalem branch 3 feet with fall 9″ per mile. The channel will terminate in salt creek (Battoprole drain) 5 miles $3\frac{1}{2}$ furlongs from head sluice where a cheap escape weir will be built.

*Vizeshweram branch channel.*—A dam with waterway of 1′ 9″ will be built at the head of this channel which has a bed width of 7 feet and fall of 1 foot per mile. The depth of water in this channel at F.S.L. will be 2 feet and area irrigated 600 acres.

*General.*—All surplus spoil obtained from the channel cutting after right bank has been formed will be used for strengthening canal bank.

13th December 1890. (Signed) C. J. USSHER,
Executive Engineer, Eastern Sub-division.

11th January 1891. (Signed) J. E. PAUL,
Executive Engineer, Kistna Western Division.

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ESTIMATE form, Abstract, Classified.

| Sub-head. | Names of works. | Amount of estimate for individual work. | Total of Sub-heads. | Total for each canal or distributary. | Total of each main head. | Remarks. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | MAJOR WORKS (CONSTRUCTION). | RS. | RS. | RS. | RS. | |
| | 49. IRRIGATION. | | | | | |
| | *Kistna Delta System, Western Section.* | | | | | |
| | I. Works. | | | | | |
| | Bank Canal. | | | | | |
| | (3) Distributaries. | | | | | |
| B. Land .. | 1. Potumeraka channel .. .. | 1,070 | | | | |
| Do. .. | 2. Sodaipalem branch .. .. | 190 | | | | |
| | | | 1,260 | | | |
| C. Works .. | 3. Head sluice for Potumeraka channel .. | 2,070 | | | | |
| Do. .. | 4. Dividing dam for Vizeshweram channel .. .. .. | 200 | | | | |
| | | | 2,270 | | | |
| L. Earthwork. | 5. Potumeraka channel .. .. | 4,120 | | | | |
| Do. .. | 6. Sodaipalem branch .. .. | 240 | | | | |
| | | | 4,360 | | | |
| | | | | 7,890 | | |

11th January 1891. (Signed) J. E. PAUL,
Executive Engineer, Kistna Western Division.

3rd February 1891. (Signed) J. HANNAN,
Superintending Engineer, II Circle.

ORDER—dated 9th March 1891, No. 227 I., Public Works.

The estimate, amounting to Rs. 7,890, for the Potumeraka channel, a distributary of the Bank canal, Kistna Western delta, is sanctioned in lieu of the provision aggregating Rs. 10,835 (not Rs. 9,825 as erroneously stated by Superintending Engineer) for this and the Vizeshweram channels made in the classified abstract estimate * printed in Proceedings of Madras Government, No. 577 I., dated 1st October 1888, the saving of Rs. 2,945 effected by the present estimate being added to the amount reserved for unforeseen works of the Kistna delta which will then be increased to Rs. 2,81,153.

* Vide items Nos. 907, 908, 930, 931, 947 and 948.

2. This sanction has been registered as No. 157 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with 18 enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 9th.*

*Recd.* *Encl.*

**G.O., 9th Mar. 1891, No. 227 I.**

**MARCH.**

**Potumeraka Channel**

Estimate of Rs. 7,890 for the —, Kistna Western division, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

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Irrigation.

READ—the following paper:—

No. 42 I.

*Note by the Chief Engineer for Irrigation.*

With reference to para. 17 of G.O., Revenue, No. 1026, dated 19th December 1890, ordering the consideration in this department of Mr. Horsfall's suggestion "that the Nowgam portion of the canal (Ganjam-Gopálpur) be completed at least as far as Chatrapur where it will meet the line of railway," I have visited the place and find that the suggestion is quite impracticable; the levels do not admit of the canal (which it must be remembered is tidal) approaching Chatrapur within between two and three miles, and the level of the railway there will be at least 68 feet above the level of the canal with a ridge running up to a considerably higher level interposing.

2. About 4 miles, however, north of Chatrapur, near the 16th milestone of the road, the railway will cross the "Nowgam creek," up which boats that have come from the Chilka lake by the Chilka lake canal and crossed the Rushikulya river do now pass to the road and there unload.

3. Here the formation level of the line will be only about 25 feet above mean sea level, and it is worthwhile considering whether the railway should not at the place provide a siding and conveniences for the transference of grain, &c., between boats and railway trucks. If it does so, then it will be advisable to spend something on improving the creek. It appears, however, that the railway will touch the Chilka lake itself some 15 miles further north, and it does not seem likely that produce which wishes to make use of the railway, and which almost all comes from the northern portion of the lake, would even if going southwards pass a station on the borders of the lake to go 15 miles further by the shallow portion of the lake and the canal to the Nowgam creek.

CHEPÂK,
4th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 9th March 1891, No. 228 I., Public Works.

Communicated to the Consulting Engineer for Railways for consideration and report with reference to the remarks of the Chief Engineer for Irrigation in paras. 2 and 3 of his "note" above printed.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Consulting Engineer for Railways.
" Superintending Engineer, I Circle.
" Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 9th.*

*Recd.* *Encl.*

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**G.O., 9th Mar. 1891, No. 228 I.**

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**MARCH.**

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## Gopalpur Canal

Note by the Chief Engineer for Irrigation on the proposal for completing the Nowgam portion of the — as far as Chatrapur, communicated to the Consulting Engineer for Railways for report.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

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**Irrigation.**
**Account.**

READ—the following paper :—

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 26th January 1891, No. 39.

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MR. CLOGSTOUN.

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*Read*—G.O., dated 23rd August 1889, Mis. No. 5429, Revenue.

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*Read*—again Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 11th September 1889, No. 429.

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*Read*—again Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 23rd November 1889, No. 533.

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*Read*—also the following papers :—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| From the Collector | of Arcot, North, | dated | 17th Dec. | 1889, | No. | 121. |
| „ | „ | of „ | „ | 6th Aug. | 1890, | „ | 75. |
| „ | „ | of Arcot, South, | „ | 24th Dec. | 1889, | „ | 474-B.A. |
| „ | „ | of „ | „ | 29th July | 1890, | „ | 810. |
| „ | „ | of Ganjam, | „ | 14th June | „ | „ | 4271. |
| „ | „ | of „ | „ | 5th Aug. | „ | „ | 5382. |
| „ | „ | of „ | „ | 10th „ | „ | „ | 5553. |
| „ | „ | of Godávari, | „ | 30th July | „ | „ | 58. |
| „ | „ | of „ | „ | 30th „ | „ | „ | 59. |
| „ | „ | of „ | „ | 21st Nov. | „ | „ | 87. |
| „ | „ | of Kistna, | „ | 1st Mar. | „ | „ | 1426. |
| „ | „ | of „ | „ | 5th July | „ | „ | 4864. |
| „ | „ | of „ | „ | 6th Aug. | „ | „ | 5783. |
| „ | „ | of Madura, | „ | 18th Feb. | „ | „ | 24. |
| „ | „ | of Nellore, | „ | 25th April | „ | „ | 933-Ver. |
| „ | „ | of „ | „ | 13th Aug. | „ | „ | 2005-Ver. |
| „ | „ | of Salem, | „ | 11th Jan. | „ | „ | 55. |
| „ | „ | of „ | „ | 25th Aug. | „ | „ | 1997-Genl. |
| „ | „ | of Tanjore, | „ | 31st Jan. | „ | „ | 72. |
| „ | „ | of Tinnevelly, | „ | 8th Mar. | „ | „ | 229. |
| „ | „ | of „ | „ | 18th July | „ | „ | 592. |
| „ | „ | of Trichinopoly, | „ | 24th Dec. | 1889 | „ | 525-4. |

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*Resolution*—dated 26th January 1891, No. 39.

| | |
|---|---|
| Godávari anicut. | Pennér anicut. |
| Kistna do. | Sangam do. |

As directed in G.O., dated 3rd August 1889, No. 362 I., Public Works, the Board begs to submit a statement showing the amount at 4 per cent. to be credited to the marginally-noted irrigation systems out of the sale-proceeds of tank-bed lands

rendered unnecessary by the works. The Collector of Tinnevelly states that no regular accounts have been maintained of the sale-proceeds of certain tank-bed lands and other waste lands in the Otapidáram taluk which is benefited by the Srívaikuntham anicut, and that a major portion of the revenue so realized was appropriated to channel improvements and that it is impossible to furnish an accurate statement of the amount actually realized. He adds that in the other taluk of the district affected by the anicut there was no sale of such tank-bed lands. The Collectors of the Districts in which the other irrigation systems falling under classes I and II exist report that no revenue was realized from the sale of these lands.

(A true Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

To the Chief Engineer for Irrigation.
,, Examiner of Public Works Accounts.

Copy to the Secretary to Government, Revenue Department.

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## APPENDIX.

STATEMENT showing the amount to be credited to the Irrigation Systems of Classes I and II works out of the sale-proceeds of tank-bed lands calculated at 4 per cent. thereon.

| Name of system. | Fasli. | Amount of sale-proceeds of tank-bed lands realized in each fasli. | Total amount realized. | Amount to be credited to the work at 4 per cent. on the amount realized by sale of tank-bed lands. |
|---|---|---|---|---|
| | | RS. A. P. | RS. A. P. | RS. A. P. |
| | 1279 .. | 30 0 0 | 30 0 0 | 1 3 2 |
| | 1280 .. | .. | 30 0 0 | 1 3 2 |
| | 1281 .. | .. | 30 0 0 | 1 3 2 |
| | 1282 .. | .. | 30 0 0 | 1 3 2 |
| | 1283 .. | 155 0 0 | 185 0 0 | 7 6 5 |
| | 1284 .. | .. | 185 0 0 | 7 6 5 |
| | 1285 .. | .. | 185 0 0 | 7 6 5 |
| | 1286 .. | .. | 185 0 0 | 7 6 5 |
| | 1287 .. | 2,190 0 0 | 2,375 0 0 | 95 0 0 |
| | 1288 .. | 3,915 0 0 | 6,290 0 0 | 251 9 7 |
| Godávari anicut .. | 1289 .. | 100 0 0 | 6,390 0 0 | 255 9 7 |
| | 1290 .. | .. | 6,390 0 0 | 255 9 7 |
| | 1291 .. | 400 0 0 | 6,790 0 0 | 271 9 7 |
| | 1292 .. | .. | 6,790 0 0 | 271 9 7 |
| | 1293 .. | 231 0 0 | 7,021 0 0 | 280 13 5 |
| | 1294 .. | 295 0 0 | 7,316 0 0 | 292 10 3 |
| | 1295 .. | .. | 7,316 0 0 | 292 10 3 |
| | 1296 .. | .. | 7,316 0 0 | 292 10 3 |
| | 1297 .. | .. | 7,316 0 0 | 292 10 3 |
| | 1298 .. | 3,768 0 0 | 11,084 0 0 | 443 5 9 |
| | 1299 .. | .. | 11,084 0 0 | 443 5 9 |
| Total .. | .. | 11,084 0 0 | .. | 3,773 8 2 |
| | 1280 .. | 904 11 7 | 904 11 7 | 36 3 0 |
| | 1281 .. | .. | 904 11 7 | 36 3 0 |
| | 1282 .. | .. | 904 11 7 | 36 3 0 |
| | 1283 .. | .. | 904 11 7 | 36 3 0 |
| | 1284 .. | .. | 904 11 7 | 36 3 0 |
| | 1285 .. | .. | 904 11 7 | 36 3 0 |
| | 1286 .. | 340 0 0 | 1,244 11 7 | 49 12 8 |
| | 1287 .. | 3,402 5 2 | 4,647 0 9 | 185 14 0 |
| | 1288 .. | .. | 4,647 0 9 | 185 14 0 |
| Kistna anicut .. | 1289 .. | .. | 4,647 0 9 | 185 14 0 |
| | 1290 .. | .. | 4,647 0 9 | 185 14 0 |
| | 1291 .. | 3,135 0 0 | 7,782 0 9 | 311 4 6 |
| | 1292 .. | .. | 7,782 0 9 | 311 4 6 |
| | 1293 .. | .. | 7,782 0 9 | 311 4 6 |
| | 1294 .. | .. | 7,782 0 9 | 311 4 6 |
| | 1295 .. | .. | 7,782 0 9 | 311 4 6 |
| | 1296 .. | .. | 7,782 0 9 | 311 4 6 |
| | 1297 .. | 2,050 0 0 | 9,832 0 9 | 393 4 6 |
| | 1298 .. | 50,798 6 9 | 60,630 7 6 | 2,425 3 6 |
| | 1299 .. | 5,651 0 10 | 66,281 8 4 | 2,651 4 2 |
| Total .. | .. | 66,281 8 4 | .. | 8,347 13 10 |

Statement showing the amount to be credited to the Irrigation Systems of Classes I and II works out of the sale-proceeds of tank-bed lands calculated at 4 per cent. thereon—*cont.*

| Name of system. | Fasli. | Amount of sale-proceeds of tank-bed lands realized in each fasli. | Total amount realized. | Amount to be credited to the work at 4 per cent. on the amount realized by sale of tank-bed lands. |
|---|---|---|---|---|
| | | RS. A. P. | RS. A. P. | RS. A. P. |
| Pennér anicut .. | 1290 .. | 739 4 0 | 739 4 0 | 29 9 2 |
| | 1291 .. | .. | 739 4 0 | 29 9 2 |
| | 1292 .. | .. | 739 4 0 | 29 9 2 |
| | 1293 .. | 247 0 0 | 986 4 0 | 39 7 2 |
| | 1294 .. | .. | 986 4 0 | 39 7 2 |
| | 1295 .. | .. | 986 4 0 | 39 7 2 |
| | 1296 .. | 1,656 0 0 | 2,642 4 0 | 105 11 0 |
| | 1297 .. | 3,158 0 0 | 5,800 4 0 | 232 0 2 |
| | 1298 .. | .. | 5,800 4 0 | 232 0 2 |
| | 1299 .. | .. | 5,800 4 0 | 232 0 2 |
| Total .. | .. | 5,800 4 0 | .. | 1,008 12 6 |
| Sangam anicut .. | 1296 .. | 5,481 6 6 | 5,481 6 6 | 219 4 1 |
| | 1297 .. | .. | 5,481 6 6 | 219 4 1 |
| | 1298 .. | .. | 5,481 6 6 | 219 4 1 |
| | 1299 .. | 18,634 11 6 | 24,116 2 0 | 964 10 4 |
| Total .. | .. | 24,116 2 0 | .. | 1,622 6 7 |

ORDER—dated 9th March 1891, No. 229 I., Public Works.

The Examiner of Public Works Accounts will credit to the following systems the amounts noted against each as indirect revenue in the accounts for the current year:—

| | RS. |
|---|---|
| Godávari delta ... ... ... ... ... ... ... | 3,773 |
| Kistna „ ... ... ... ... ... ... ... | 8,348 |
| Pennér anicut ... ... ... .. ... ... ... | 1,009 |
| Sangam „ ... ... ... ... ... ... ... ... | 1,622 |

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, I Circle.
„ „ „ II „
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 9th.*

*Recd.* *Encl.*

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**G.O., 9th Mar. 1891, No. 229 I.**

---

**MARCH.**

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### Indirect Revenue

The Examiner, Public Works Accounts, directed to credit against certain systems the amounts noted against them as — in the accounts of the current year.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.

READ—the following paper :—

From Major O. V. BODDY, R.E., Executive Engineer, Buckingham Canal division, to the Superintending Engineer, II Circle, dated Madras, 12th January 1891, No. 1393.

I have the honor to inform you that the construction of wharves at Papanchavadi * in the third mile of the southern canal and Pedda Ganjam † in the 195th mile of northern canal having been completed, the usual Government notification in the Gazette, declaring the wharves open for traffic, may issue. The latter station may be declared to be a temporary wharf during the time that the Kistna canals are closed.

* Sanctioned in G.O., 182 I., 20th March 1890.
† „ „ 642 I., 18th Oct. 1887.

No. 259 B.C.

Copy submitted to the Chief Engineer for Irrigation with the request that the usual notification may be ordered to be published in the Gazettes concerned.

BEZVADA,
21st January 1891.

(Signed) J. HANNAN,
Superintending Engineer, II Circle.

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ORDER—dated 9th March 1891, No. 230 I., Public Works.

Ordered that the following notification be published in the *Fort St. George Gazette* :—

PUBLIC WORKS DEPARTMENT.

NOTIFICATION.

*Buckingham Canal.*

The wharves at *Papanchavadi* in the third mile of the southern portion of the canal and at *Pedda Ganjam* in the 195th mile of the northern portion of the canal are hereby declared to be wharves under rule 17 of the Navigation Rules, Godávari, Kistna and Buckingham canals (now in force under the Canal and Ferries Act No. II of 1890—see notification in page 88, part I, of the *Fort St. George Gazette*, dated 10th February 1891), and, as provided in that rule, wharfage fees at one anna per ton on the registered tonnage will be levied on all boats loading and unloading at the wharves now declared from the 1st April 1891.

2. The Superintending Engineer will arrange to have the notification published in the Kistna and Nellore Gazettes.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, I Circle.
„ „ „ II „
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 9th.*

*Recd.* *Encl.*

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**G.O., 9th Mar. 1891, No. 230 I.**

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## MARCH.

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## Wharves

Notification declaring the — at Papanchavadi and at Pedda Ganjam to be open for public traffic, ordered to be published in the Fort St. George and Kistna and Nellore District Gazettes.

# GOVERNMENT OF MADRAS.

# PUBLIC WORKS DEPARTMENT.

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### Irrigation.

READ—the following papers :—

From L. L. HALL, Esq., Secretary of the Hyderabad Deccan Company (Limited), to the Chief Engineer for Irrigation, dated 16, St. Helen's Place, Bishopsgate Street, London, E.C., 9th January 1891.

The operations of this company in the Singareni coal field have so far advanced that the time has arrived for considering the best methods of putting into the markets of Southern India the produce of those fields at a price which will be mutually advantageous to the company and the consumers.

2. The most direct route for the carriage of the coal to Madras from the collieries is by railway to Bezváda, 92 miles, of which 22 miles are on a line belonging to the British Government in British territory, and thence by canal, 269 miles.

3. On this subject I am directed to refer to the enclosed copy of Lieutenant-Colonel Pennycuick's note No. 92 E.W., dated the 1st December 1886, on the carrying capacity of the Buckingham canal. In that note Lieutenant-Colonel Pennycuick held out the prospect that, by the end of 1889, "the canal will probably be practically a permanent line of communication, though it will always be liable to injury from abnormal floods." My Board are not aware to what extent this prospect has been realized. Lieutenant-Colonel Pennycuick further thought that "it would be desirable to have boats specially built and worked by the owners themselves (of the coal fields) and that trains of boats towed by steamers at a slow speed (not exceeding $2\frac{1}{2}$ or 3 miles per hour) would be the most economical and efficient mode of transport." He entered into details as to the dimensions of the boats and added calculations of the cost of transport by means of steam towage. These calculations were not put forward as authoritative.

4. I am directed to inquire whether the Government of Madras would be prepared to undertake to keep the canal in working order for the service of trains of barges towed by steam-tugs as contemplated by Lieutenant-Colonel Pennycuick if this company arranged for the supply of the necessary barges and tugs.

5. It is evident that, if coal can be laid down in Madras at cheap rates and in sufficient * quantities, it will supply not only all the railways in the whole Madras Presidency, including Mysore, but also the machinery for gold-mining mills and other industries.

* *Vide* letter, dated 16th January 1891 (R. No. 66 M.).

By this means the deforesting of the country for the supply of wood fuel would be checked and a more economical and convenient fuel would be substituted.

6. My Board is satisfied that the Singareni coal field is capable of turning out any quantity of good coal that may be required for these purposes, and the only question remaining to be determined is its cheap carriage.

Before taking further steps, my Board would require to be informed if any charges are made by the Government for the use of the canal, and, if so, of what nature and amount. Lieutenant-Colonel Pennycuick does not seem to have contemplated any such charges.

7. May I ask the favor of an early reply, as the matter is of urgent importance and it will take some time for this company to make all the necessary arrangements for the supply of the boats and the maintenance of the service.

From the Secretary of the Hyderabad Deccan Company (Limited), dated 16th January 1891.

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No. 38 I.

*Note by the Chief Engineer for Irrigation.*

With reference to the letter of 9th January from the Hyderabad (Deccan) Company, which reached me whilst on tour in the Ganjam district, it would be unwise for Government to give any such undertaking as that asked for in para. 4.

2. Much has been done to improve the Buckingham canal and the amount of the traffic on it indicates the success of the work, but the river-crossings, especially that of the Pennér, frequently cause delays to traffic, the liability to which must be taken into consideration by any one contemplating using on the canal an extensive and costly floating plant.

3. The navigation rules now in force, which give the navigation license and toll rates, may well be supplied to the company and will furnish the information asked for in para. 6 of the letter, but there is a probability of the rates being before long enhanced.

CHEPÂK,
28th February 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 9th March 1891, No. 233 I., Public Works.

His Excellency the Governor in Council must decline to give any undertaking as to the suitability of the Buckingham canal, either present or prospective, for the carriage of coal on an extensive scale and must leave the company to form its own judgment on the subject.

2. A copy of the navigation rules now in force will be furnished to the company, but it will be understood that they are liable to alteration at any time and that the rates of licenses, fees and tolls which now obtain will probably be before long enhanced.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Secretary of the Hyderabad Deccan Company, London.
" Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 9th.*

*Recd.* *Encl.*

**G.O., 9th Mar. 1891, No. 233 I.**

## MARCH.

### Coal

Declining to give to the Hyderabad Deccan Company (Limited) any undertaking as to the suitability of the Buckingham canal for the carriage of — on an extensive scale and forwarding to the company a copy of the navigation rules in force.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper :—

Telegram from the Superintending Engineer, I Circle, to the Chief Engineer for Irrigation, dated Dowlaishweram, 10th March 1891, No. 200.

Please transfer if possible Rs. 1,000 from Repairs, 43. Irrigation Works, not kept, to Original Works, River Embankments, Rajahmundry to Yanam Eastern Division.

ORDER—dated 12th March 1891, No. $\frac{237}{A}$ I., Public Works.

The following transfer of funds is sanctioned :—

Provincial.
43. Minor Works and Navigation.
Godávari Eastern Division.

| *From* | | *To* | |
|---|---|---|---|
| Works for which neither Capital nor Revenue Accounts are kept. | RS. | Agricultural works. | RS. |
| Ordinary irrigation works—Repairs ... | 1,000 | Gowtami-Godávari left bank, Rajahmundry to Yanam ... ... ... | 1,000 |
| Establishment ... ... ... | 230 | Establishment ... ... ... ... | 230 |
| Tools and plant ... ... ... | 15 | Tools and plant ... ... ... | 15 |
| Total ... | 1,245 | Total ... | 1,245 |

2. The following deferred telegram will be sent to the Superintending Engineer, I Circle :—

"Your telegram 200, 10th instant. Proposed transfer of funds sanctioned."

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 12th.*

*Recd.* *Encl.*

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**G.O., 12th Mar. 1891, No. $\frac{237}{A}$ I.**

---

**MARCH.**

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**Transfer of funds**

The — proposed by the Superintending Engineer, I Circle, in the Godávari Eastern division, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

---

**Irrigation.**
**Account.**

READ—the following paper :—

From J. W. MARTIN, Esq., Executive Engineer in charge VI Circle, to the Chief Engineer, Public Works Department, dated Trichinopoly, 25th February 1891, No. 198 P. R.

In forwarding to you copy of letter No. 165, dated 22nd instant, from the Executive Engineer, No. II Periyár division, in the matter of purchasing a pulsometer from Messrs. Oakes and Co. for Rs. 3,275, I have the honor to request your instructions as to whether I may authorize him to buy the one he has ordered from Messrs. Oakes and Co. I have informed the Executive Engineer that, without an order from you, I cannot authorize him to buy it and that he should write at once or wire to Messrs. Oakes and Co. not to send the pulsometer pending further instructions.

2. I do not know whether a pulsometer is available in the Public Works Workshops, Madras, for the Executive Engineer does not mention in his letter whether he inquired of the Superintendent of the Workshops if he can supply one. As, however, the matter seems urgent, I do not like to delay writing to you until I could ascertain from him whether he has asked the Superintendent to send a pulsometer, but this information can be ascertained direct by you from the Superintendent himself.

3. The Executive Engineer has already been called on to submit a formal estimate for a pulsometer, and as soon as it is received I shall submit to you for sanction.

---

From G. P. CARLESS, Esq., Executive Engineer, No. II Periyár division, to the Superintending Engineer, VI Circle, dated 22nd February 1891, No. 165.

In anticipation of sanction, I have ordered a pulsometer No. 7 with boiler, &c., complete, the cost of which is given by Messrs. Oakes and Co. at Rs. 3,275.

2. It is intended for the Marangaliar cross drainage work, since the late Superintending Engineer did not consider that it was expedient to buy the engine formerly used on the Vaigai bridge and steam power is absolutely necessary and was ordered by the Chief Engineer on his late inspection. By his (Chief Engineer's) orders I was authorized to offer Rs. 1,000 for the engine at Madura, but received no reply to my repeated inquiries till January last, when I was informed it would be open to tender.

3. The engine has, however, become so rusted that it is nearly useless, so I request formal sanction to purchase the pulsometer, as the work is *most emergent* and the season very favorable, so there is no time to be lost.

4. I have reported on this in my No. 78, dated 8th instant.

---

Submitted to Government.

2. The Chief Engineer, Public Works Department, has already, in anticipation of sanction, authorized the Executive Engineer to order the pulsometer at once.

(Signed) J. PENNYCUICK, Colonel, R.E.,
Chief Engineer, P.W.D.

10th March 1891.

Order—dated 12th March 1891, No. 238 I., Public Works.

The purchase for the No. II Periyár division of a pulsometer from Messrs. Oakes and Co. for Rs. 3,275 is authorized. The Superintending Engineer will submit, for formal sanction, an estimate accompanied by the statement, contrasting the English and Indian price of the pulsometer.

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, VI Circle.
„ Examiner, Public Works Accounts.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 12th.*

*Recd.* *Encl.*

---

**G.O., 12th Mar. 1891, No. 238 I.**

---

**MARCH.**

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**Pulsometer**

The purchase of a — for the No. II Periyár division, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper :—

From H. S. TAYLOR, Esq., Superintendent of Works, No. I Periyár division, to the Chief Engineer, Public Works Department, dated Periyár, 27th February 1891, No. 450 S.E.

With reference to G.O., No. 319 W., dated 3rd February 1891, and your memorandum No. 760 C., dated 13th February 1891, I have the honor to submit, herewith, for your approval and sanction, an estimate, amounting to Rs. 23,800, for purchasing machinery, &c., referred to therein.

2. The boiler for the pump to be used at the new shaft mentioned in para. 6 of my letter No. 439 S.E., dated 18th February 1891, has not been included in the estimate as the power required is so little that it will be obtained from one of the boilers or engines now here.

3. In the estimate the value of the tunnel drilling machinery is entered as Rs. 18,000 instead of Rs. 10,500. This is the price of the whole of the Ceylon machinery. The second engine and drills will enable us to push on the tunnel south end at twice the pace and so save the pay of some of the tunnel men, or, if this is not considered sufficient reason, it will be well worth the additional Rs. 7,500 and carriage, to have the steam plant at the north end to supplement the present machinery in case of water again running short or any other contingency.

---

Submitted to Government with a recommendation that the estimate of Rs. 23,800 be sanctioned, Rs. 23,519 of the amount being met from the balance at present available at the disposal of this office of the lump sum provision for tools and plant for the Periyár project and the balance of the estimate, viz., Rs. 281, from the similar provision at the disposal of the Superintendent of Works.

(Signed) J. PENNYCUICK, Colonel, R.E.,
Chief Engineer, P.W.D.

---

ORDER—dated 13th March 1891, No. 240 I., Public Works.

The estimate, amounting to Rs. 23,800, for tools and plant required for the use of No. I Periyár division, is sanctioned as shown below, the amount required to meet

the proposed outlay being met from the sources indicated in the foregoing endorsement of the Chief Engineer, Public Works Department :—

Major Works (Construction).
49. Irrigation.
Periyár Project.
III. Tools and Plant.
(12) Miscellaneous.

| | RS. |
|---|---|
| Purchasing machinery, &c., estimate ... ... ... ... ... | 23,800 |

2. This sanction has been registered as No. 158 I. of 1890-91.

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintendent of Works, No. I Periyár division, with one estimate.
" Examiner, Public Works Accounts.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 13th.*

*Recd.* *Encl.*

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**G.O., 13th Mar. 1891, No. 240 I.**

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## MARCH.

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**Tools and Plant for No. I Periyar Division**

Estimate of Rs. 23,800 for —, sanctioned.

GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Establishment.**

READ—the following paper :—

From Major D. McN. CAMPBELL, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, Tank Restoration Scheme, dated Chepâk, 23rd February 1891, No. 65 E.I.

In continuation of my letter No. 47 E.I., dated 12th February 1891, I have the honor to submit, for sanction, a supplemental estimate of Rs. 390 for five additional survey lascars required for the overseer employed on Tank Restoration operations in Ponnéri and Tiruvallúr taluks in the Chingleput division.

No. 49 I.

Submitted to Government with the recommendation that only three lascars may be sanctioned as the overseer when he has surveying and levelling to do at one and the same time may employ two coolies, or get two of the surveyor's lascars for the time in the way customary in the other Tank Investigation parties.

CHEPÂK,
9th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 13th March 1891, No. 241 I., Public Works.

The following estimate for work establishment is sanctioned :—

| | RS. |
|---|---|
| Three lascars for 13 months from 1st February 1891 to 29th February 1892 at Rs. 6 each per mensem ... ... ... ... | 234 |

2. This sanction has been registered as No. 159 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle, with one estimate.
" Examiner, Public Works Accounts.

IRRIGATION.
ESTABLISHMENT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 13th.*

*Recd.* *Encl.*

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**G.O., 13th Mar. 1891, No. 241 I.**

---

**MARCH.**

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**Lascars, Chingleput Division**

Estimate of Rs. 234 for three — for 13 months for work establishment, sanctioned.

GOVERNMENT OF MADRAS.

# PUBLIC WORKS DEPARTMENT.

## Irrigation.

READ—the following paper :—

REPORT of progress on works in No. II Periyár division for the month of January 1891.

*I Reach.*—There has been little progress during the month. The earthwork contractor M. Venkatasawmy Naidu has done absolutely nothing, and his work is at a standstill. He has wired to me to say that he had instructed his agents to carry on the work, but the said agents will do nothing. Orders regarding this man are requested; his time has been extended several times, but he seems to do less and less at each extension.

I have written to this man to tell him the terms of contract; forfeiture of guarantee fund will be strictly enforced if work is not complete by 31st March.

If he makes a spurt, now that labor is easily procurable, much may be done.

The head and scouring sluices are going on very slowly; the stone arches have been turned, but the centre part, which is of concrete, still requires to be done. The quartz collected has been condemned. Gneiss jelly has to be collected, hence the delay. The contractor, one Subba Naidu, lingers with the work.

The rates allowed for high wall work and for fine cut-stone work for cut-waters and grooves are barely sufficient; this has been ordered in inspection notes, 11th instant.

The head sluice for the Vadagarai channel was commenced on the 12th, the abutments have been raised to a height of some 4 feet and the piers some 2 feet; the same contractor as for the head sluice; he is working very badly.

He has improved, and by time of my inspection a good bit more work was done.

The other masonry works in the I Reach are going on slowly except the two culverts at the Mattapari fields and Ramara Tapuram surplus sluice which have been stopped because of water.

*Vide* my inspection notes of 11th instant.

*II Reach.*—The masonry works, viz., second and third cross drainage works, were only resumed on the 27th. The first cross drainage work is completed; completion certificate has been sent; the fourth nearly so.

I have delayed commencing these two masonry works (second and third cross drainage) because of the heavy baling, and time was allowed for the water to dry up. As regards the earthwork for the II Reach, a revised estimate (the second) will be necessary. We had to pay some Rs. 1,300 on a suit filed by a piece-worker named Rajapillay, and for this, of course, no provision was made.

The excess over the second estimate will be about this amount.

*III Reach.*—The masonry works are being pushed on most vigorously; I believe they may all be completed by the end of the official year.

For the earthwork we have already spent our allotment. I have directed that the work is not to be pushed on; but if any piece-workers like to take Rs. 3 for earth—and it is through the light soil that the excavation has been left—then the work may be resumed. There is no hurry to complete it.

*IV Reach.*—In this reach work has been going on in the deep cutting. I hope to complete the reach early in March.

*V Reach.*—The construction of the fourth branch channel head sluice has been commenced and foundations got in. In Shattiyar super-passage the concrete for the foundation will be put in a few days. I shall not be able to restart the Maranguliar super-passage until the commencement of the next month because of the crops.

For the two bridges in this reach, the one at 19 miles 5 furlongs, the centring has been fixed and the brick arch commenced, and the foundations for the bridge in the 20th mile are being excavated.

The channel is being excavated across the valley and I hope the earthwork of the V Reach will be practically completed by the end of the official year.

*Branch channels.*—The first branch channel has been completed except two cross drainage works, and in the second branch channel only one culvert remains.

Four miles of the third branch channel has been excavated. The remainder must wait; the section is so small, $1\frac{1}{2}$ feet bottom width, that it is useless to touch it.

These very small channels should, I take it, be dug by the ryots. For instance, the seventh branch channel is only $\frac{3}{4}$ of a foot at the head.

The works, both masonry and earthwork, are progressing *very slowly*. However the season is so bad that I have no doubt in a month's time we shall have as much labor as we shall desire.

The expenditure has been small, some Rs. 22,000 on works, and I have had therefore to start "collecting materials and earthwork in the VI Reach as far as Vadaculam tank" to prevent any surrenders. The small expenditure is due to some of the masonry works not being commenced until the middle of the month.

They were stopped during the monsoon because of the heavy baling; another cause is the absence of M. Vencatasawmy Naidu, the earthwork contractor for the I Reach. He has not done anything for the last two months. In spite of numberless promises I fancy he does not intend to carry out the contract.

During the month there has been no sickness either amongst the members of the staff or laborers.

The season, however, is very bad; the crops under a large number of tanks have withered and it would appear that relief works are contemplated.

METTUPUTTY,
6th February 1891.

(Signed) G. P. CARLESS,
Ex. Engr., No. II Periyár Division.

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No. 175 P.R.

Copy submitted to the Chief Engineer with inspection notes by undersigned and marginal remarks herein.

2. The whole of the allotment for the year, with the exception of the compensation (which apparently has been over-estimated as far as it has gone), will be expended. Orders have been given to push on with works for which no yearly allotments have been made so as to have an excess to fall back on in case the I Reach earthwork is not completed.

(Signed) A. C. SMITH, Lieut.-Col., R.E.,
Superintending Engineer, VI Circle.

16th February 1891.

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*Note by the Chief Engineer, Public Works Department.*

Submitted for the information of Government; the undersigned is now inspecting the works, and his remarks will be submitted in due course.

(Signed) J. PENNYCUICK, Col., R.E.,
Chief Engineer, P.W.D.

5th March 1891.

ORDER—dated 13th March 1891, No. 242 I., Public Works.

Recorded, and a copy forwarded to the Government of India in continuation of this department endorsement No. 74 I., dated 26th January 1891.

(Here enter No. 243 I., dated 13th March 1891.)

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, VI Circle.
" Chief Engineer for Irrigation.
" Revenue Department.

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ENDORSEMENT—dated 13th March 1891, No. 243 I., Public Works.

Forwarded.

(By Order.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 13th.*

*Recd.* *Encl.*

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**G.O., 13th Mar. 1891, Nos. 242 I., 243 I.**

---

**MARCH.**

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**Progress Report**

Forwarding the — of works in No. II Periyár division for January 1891.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

From H. S. TAYLOR, Esq., Superintendent of Works, No. I Periyár division, to the Chief Engineer, Public Works Department, dated Periyár, 27th February 1891, No. 451 S.E.

[*Reference.*—Telegram, dated 23rd February 1891.]

I have the honor to submit, herewith, the distribution statement of the revised sanctioned grants for the year 1890-91 including also the Rs. 12,000 surrendered by No. II Periyár division, referred to in your telegram, dated 19th February 1891.

ENCLOSURE.

STATEMENT showing the redistribution of allotments (irrigation) for 1890-91.

| Division. | Main head. | Sub-head. | Number of items. | Name of works. | Amount of estimate. | Existing grant for 1890-91. | Modification of allotment applied for. | | Proposed grant. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Reduction. | Increase. | |
| | | | | CAPITAL EXPENDITURE ON PUBLIC WORKS NOT CHARGED AGAINST REVENUE. | RS. | RS. | RS. | RS. | RS. |
| | | | | 49. *Irrigation.* | | | | | |
| Office of Superintendent of Works, No. I Periyár division. | (1) Head works. | C. Works .. | 1 | Main dam .. .. | 6,91,000 | 1,95,948 | .. | * 56,113 | * 2,52,061 |
| | | | 2 | Right bank escape .. | 1,37,000 | 34,000 | .. | 15,000 | 49,000 |
| | | | 3 | Water-shed cutting .. | 1,20,000 | 16,000 | .. | 7,000 | 23,000 |
| | | | 4 | Do. tunnel .. | 2,61,000 | 53,000 | .. | 7,000 | 60,000 |
| | | K. Buildings .. | 5 | Buildings at Periyár and Thekady .. | 1,78,740 | 28,410 | .. | 7,000 | 35,410 |
| | | O. Miscellaneous. | 6 | Roads, locks and dams, &c. | 87,000 | 28,000 | .. | 7,000 | 35,000 |
| | | P. Maintenance. | 7 | Maintenance during construction .. .. | 50,000 | 3,990 | .. | 5,000 | 8,990 |
| | | | 8 | Tools and plant .. .. | .. | 51,000 | .. | 54,000 | 1,05,000 |
| | | | | Total .. | .. | 4,10,348 | .. | * 1,58,113 | * 5,68,461 |
| | | | | Establishment charges at 23 per cent. on works allotment .. .. .. | .. | 82,650 | .. | * 23,945 | * 1,06,595 |
| | | | | Grand total .. | .. | † 4,92,998 | .. | ‡ 1,82,058 | * 6,75,056 |

* These figures are altered in the office of the Chief Engineer, Public Works Department.

† Sanctioned in G.O., No. 698 I., dated 1st December 1890.

| | RS. |
|---|---|
| ‡ ,, in ,, ,, 70 I.A., dated 24th January 1891 .. .. | 1,00,000 |
| ,, (*vide* Chief Engineer's telegram, dated 23rd February 1891) .. | 70,000 |
| Surrendered by No. II Periyár division .. .. .. .. | 12,058 |
| Total .. | 1,82,058 |

PERIYAR,
27th February 1891.

(Signed) H. S. TAYLOR,
Superintendent of Works, No. I Periyár division.

ORDER—dated 13th March 1891, No. 244 I., Public Works.

The statement showing the redistribution of the allotments for the No. I Periyár division received with the foregoing letter from the Superintendent of Works is approved, the allotment for the Periyár main dam (item 1) being increased by Rs. 48 and that for establishment by Rs. 10 to absorb the balance of the surrender from the No. II Periyár division, dealt with in Proceedings of the Madras Government, No. 188 I., dated 27th February 1891.

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W D.

To the Chief Engineer for Irrigation.
„ Superintendent of Works, No. I Periyár division.
„ Examiner, Public Works Accounts.
„ Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 13th.*

*Recd.* *Encl.*

---

**G.O., 13th Mar. 1891, No. 244 I.**

---

**MARCH.**

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**Redistribution of Allotment for No. I Periyar Division**

The proposed —, approved.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

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### Irrigation.
### Account.

READ—the following papers :—

From Lieut.-Colonel A. C. SMITH, R.E., Superintending Engineer, VI Circle, to the Chief Engineer for Irrigation, dated Kodaikánal, 12th July 1890, No. 398 T. C.

With reference to your endorsement No. VI-2 T.C., dated 26th April 1887, I have the honor to submit, for your approval and sanction of Government, the accompanying plans and estimate, amounting to Rs. 42,690, with report, for extending the Nundyar channel, Udayárpálaiyam taluk, Trichinopoly district.

2. The Collector, in his letter No. 3-12 of 12th February 1887 (copy enclosed), states that by the proposed extension an area of 1,800 acres can be brought under wet cultivation, resulting in an increase of revenue to the extent of about Rs. 4,550.

3. The villagers concerned have promised to contribute Rs. 1,000 towards the construction of Manodai aqueduct, of which a sum of Rs. 550 has already been contributed by them. As regards the balance of Rs. 450, the Collector states in his letter No. 55-12, dated 4th July 1890, returning the estimate countersigned, that he asked the Deputy Collector to collect it at once.

4. The rates entered in the estimate are fair. The work being of a remunerative character, I request that the estimate may be sanctioned as soon as possible.

5. A sum of Rs. 8,000 provided for the work in the current year's preliminary budget having been omitted in the final issue, I request that a special grant of Rs. 8,000 may be allotted for expenditure during the current year. If this amount cannot be met from the reserve at the disposal of Government, I would propose the transfer of the amount for the present as noted in the margin.

43. Minor Works.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Repairs.

| | RS. |
|---|---|
| From Trichinopoly division from the grant of Rs. 35,000 ... ... | 4,000 |
| From Tinnevelly division from the grant of Rs. 70,000 ... ... ... | 4,000 |
| Total ... | 8,000 |

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To the Superintending Engineer, VI Circle, dated 3rd September 1890, No. 20 T.C.
From „ „ „ „ 17th January 1891, „ 1258 „

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ENCLOSURE.

REPORT to accompany the estimate for extending the Nundyar channel No. 166 in the list of Imperial Irrigation works in the Trichinopoly taluk, Rs. 26,800.

[*Reference.*—Superintending Engineer's endorsement No. 670 T.C., dated 15th October 1890, on Irrigation Chief Engineer's memo. No. VI-20 T.C., dated 3rd September 1890, returning, for revision, the estimate of Rs. 42,690 submitted for sanction with Mr. Larminie's report, No. 90 S.E., dated 25th April 1890.]

In the above report all the details required for the work have been explained fully, so nothing more has to be added with the exception of the following :—

(1) A tabular statement* of works in form No. M. 214 is attached to the present estimate, from which it will be seen that the discharge on each section of the channel is calculated by Bazin's formulæ on reduced slopes from 2 to 1 to 1½ to 1 as far as cross section No. 39 as instructed by the Chief Engineer for Irrigation.

* With calculation sheets.

(2) The bridge at 3 miles 360 feet is to be over the channel where it is in rock cutting; 25 running feet of waterway will be enough, but from the correspondence with Messrs. Massey and Co., Madras, it is seen that they have at present ready for immediate delivery a "rolled steel girder" bridge of 30′ span with width of roadway 9 feet and could be delivered at Trichinopoly Fort station for Rs. 1,255 and further state that, if required, they can cut the bridge 2 feet shorter, but could not reduce the price on that account; hence it has been arranged to keep the bed 25 feet with the batter 1 in 4 on each side in rock cutting in addition to 1 foot of offset on each side from the face of abutments to suit the iron work of the bridge of 30 feet span. The proposed plan No. 5 sheet No. 1 is herewith.

(3) The arrangement of square wells has been adapted to the Manodai aqueduct and also all the instructions of the Chief Engineer have been carefully attended to in revising; the plan No. 4 sheet No. 2 is herewith.

(4) An estimate of Rs. 950 for providing screw gearing shutters to the main head sluice was sanctioned locally and the work is going on.

2. The distributaries branching off from the main channel are under regulating sluices; hence there is no fear of water reaching the extension and lands for which it is intended; * but the vents of three of the regulating sluices are large; they can be arranged to suit the required discharge of the channels. The work can be carried out from the lump sum provision in the estimate under the head contingencies.

* *Vide* statement of distribution of water attached.

3. There is a saving of Rs. 15,890 by the alterations made in the original estimate.

4. The work will be executed in conformity with the standard specification.

5. The rates are fair and the estimate may be sanctioned.

6. No grant will be required for this year as the estimate will probably be sanctioned rather late in the year.

15th December 1890.

(Signed) ROSS THOMPSON, Colonel, R.E.,
Executive Engineer, Trichinopoly division.

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REPORT to accompany the estimate for the extension of the Nundyar channel, No. 166 Imperial list.

*Description.*—The channel takes off from the Nundyar river a little above the anicut near the junction of the river with the Coleroon in the 27th mile left bank.

2. *Early proposals.*—The idea of extending the channel seems to have first originated about the year 1856 in Major Ryves' time, when an elaborate survey * of all the country below (*i.e.* east) the Nundyar river and between the Coleroon and the high land to the north of it was prepared; the extension is shown on this survey as a contour channel skirting the high ground.

* Herewith.

3. Nothing further then seems to have been done in the matter; it was probably seen that the Nundyar river could not possibly supply water for so large an area. But in 1886, at the request of the ryots of interested villages, Mr. Martin, Executive Engineer, inspected the locality and in his No. 35 S.E. of 5th May 1886 reported on the advisability of extending the channel, giving at the same time particulars of the rivers Coolyaur and Nundyar and a table showing the number of days in eight consecutive years on which water stood at or over 3 feet on the head sluice floor. A copy of this table accompanies this report and another table has now been prepared showing the number of days for the same eight years water stood at or above 4 feet. This latter table is of importance, as it shows that it will scarcely be safe to count on a depth of 4 feet on the head sluice, as has been done by Mr. Grimes, when framing the estimates returned for revision by the Superintending Engineer with his No. 546 T.C. of 8th September 1888 (former reference).

4. However an examination of these tables will show that at all events a depth of 3 feet in the channel in rear of the head sluice may safely be counted on.

5. *Present supply down the channel.*—The area at present irrigated by the channel is 7,480 acres and the required supply at 2 cubic yards per acre per hour is 112 cubic feet per 1 inch; but the channel with its present section and bed fall of about 9 inches per mile cannot discharge more than 58 cubic feet per 1 inch or just 52 per cent. of the full required quantity.

6. But there is no difficulty in carrying on the cultivation and the supply has always apparently been ample for the present ayacut.

7. It is consequently now proposed to design the channel for irrigating the proposed extension of ayacut; to carry only 94 cubic feet per second or 66 per cent. of the full (at a depth of 3 feet) (142 cubic feet per 1 inch) theoretic supply and this will require a channel of 25 feet bed width and slopes of 2 : 1 fall 9 inches per mile (present channel 20 feet, average bed width, sides nearly vertical).

| | ACS. |
|---|---|
| At present .. .. .. .. .. .. | 7,480 |
| Extension .. .. .. .. .. .. | 2,000 |
| Total .. | 9,480 |

8. For those days when a depth of 4 feet can be obtained, this channel will carry rather more * than the full theoretic supply of 142 feet per 1 inch, as calculated by Kutter's formula for channels in moderately † good order.

* 162 cubic feet per inch.

† N = ·03.

9. *Fall of channel* 9 *inches per mile.*—The former estimates allowed only 6 inches fall per mile, but it is now found that by fixing the F.S.L. of the Kandradithum tank at 34·81 ‡ *i.e.*, at the level of the crest of the existing weir, this fall (9 inches) can be secured.

‡ The tank rarely stands higher than this.

10. The dimensions of the channel lower down will be reduced as shown by the accompanying table, giving the position and acreage below each point.

11. *Slopes.*—Slopes of 2 : 1 have been allowed for, as it is considered that in ordinary soil anything steeper will not stand; a short length of the channel in the third mile is in rock through which the sides can be cut almost vertical, or, say, ½ : 1—the mean width to be that of the rest of the channel for a depth of 3 feet (*i.e.*, 30 feet).

12. *Land required.*—No provision is made for land compensation as along the existing channel there is an ample width of padugay and for the extension the interested ryots have agreed to give up the land free as stated in the General Charge Deputy Collector's letter No. 740 of 6th November 1886 to the address of the Acting Collector. However, for that portion of the extension which runs above the Kandradithum tank and which cannot (though the ryots are anxious it should) command any land, some small amount § may be required. Most of it is by right tank pymash, for which pattas have been granted.

§ Provided in the estimate.

13. *General arrangements.*—The former estimate provided for taking off the extension direct from the Kandradithum tank, but with reference to para. 4 of Superintending Engineer's No. 546 T.C., dated 8th September 1888, returning the estimates, it is now proposed to arrange the extension so as to be quite independent of the Kandradithum tank, for, although in his letter No. 70/12 of 31st October 1888, to the Superintending Engineer, the Collector states that the ryots cultivating under the tank would raise no objection, still he (the Collector) seems to think that to avoid possibility of disputes the extension should be quite independent.

14. Accordingly it is proposed to place its head a little below the Kolamanikum sluice or 380 feet above mile 6 of the main channel; thence it will run, as shown on Major Ryves' survey, a little above the tank waterspread to the north end of the Kandradithum tank bund, the channel for a short length passing through the tank cutting off a trifling portion of the northern waterspread, the channel right bank thus replacing the present low and weak northern portion of the tank bund (which frequently breached at its end); along this new length all excavated spoil will be placed so as to form a right bank; the left side of the channel will be left open so as to allow of discharge by the channel of the small amount of cross drainage intercepted.

15. By thus passing the channel out of the north end of the tank, the necessity for a new sluice or the enlargement of the Aramanakurichi sluice, were the extension taken off from the tank, is avoided, but, on the other hand, some means of regulation will eventually be required where the extension takes off from the Nundyar channel as now proposed.

16. Either a head sluice to the extension, or perhaps what would be better, a dividing dam by means of which the supply might be diverted to either. As the main estimate is urgently required a lump sum provision of Rs. 600 is made for this work. The form of work can be settled after some experience of the working of the channel has been gained, but the waterway for each channel, if a dam be decided on, should equal the theoretic sections at this point.

17. *Extension of channel.*—From its off-take near the sixth mile of the Nundyar channel, as far as the northern end of the Kandradithum tank, a distance of 1⅓ miles, the extension will have a bed fall of 2 feet per mile, taking acres 2,000 as the area to be brought under wet cultivation. (1,800 acres is the actual area given by the Deputy Collector.) Under circular No. 7, 40 cubic feet per second should be provided, arranging, as in the case of the main ‖ channel, for a reduced discharge (say 76 per cent. ¶ of this quantity) or 30 cubic feet per 1 inch, with a depth of 2¼ feet passing down, a bed width of 5 feet, with slopes of 2 : 1 will be required.

‖ Para. 7.

¶ As the area dealt with is so much smaller, a higher percentage has been allowed for.

18. The cost of this part of the project, Rs. 600 for regulator at head + cost of 1⅓ miles of channel Rs. 2,400, is considerably more than if the extension were taken off direct from the northern end of the tank, when only a new sluice cost, say Rs. 600, would be required against Rs. 3,000, the cost of the arrangement independent of the tank.

It is a question if the advantages are worth the additional expenditure of Rs. 2,400.

19. *Channel below Kandradithum tank.*—From the tank bund eastward, the channel will have a fall of 3 feet per mile, side slopes 2 : 1, and bed width of 4 feet and this section with a

depth of 2½ feet will carry 80 per cent. of the maximum required supply of 40 cubic feet per 1 inch, the discharge by Kutter's co-efficient for a channel in moderately good order being 32 * cubic feet per 1 inch.

* A channel of 3½ feet bed would just give a discharge of 30 cubic feet per 1 inch.

20. The channel will be of this section for a length of 4 miles from the tank bund, for the remaining 1 mile and 1,900 feet a bed width of 3 feet will suffice.

21. *Drops.*—Four drops were originally provided for; as now laid out one drop of 2 feet at the third mile of extension will suffice. It will be better to build a properly designed drop with splayed rear wings and short lengths of revetment, as make-shift arrangements will only cause much scour and ultimate trouble with the channel. The design accompanies.

22. It may appear from the longitudinal section that in places water level in the channel is below the land to be irrigated, this is of no consequence as the channel has been aligned along the ridge and the ground falls quickly away from it on both sides.

23. On Mr. Grimes' section (laid out by Overseer Arumugam Pillai) water level is placed needlessly high above field level, thus placing the channel in heavy embankment, which, as now laid out, has been almost entirely avoided.

24. The land to be brought under wet cultivation lies to the east of the Manodai, at crossing of which, the most expensive item of the estimate, an aqueduct will be required.

25. *Aqueduct.*—The Manodai † is crossed 7,800 feet from the tank bund. The drainage area above this point is some 45 square miles, but, on comparing the probable maximum run off from this area with the section of the odai and maximum flood levels as pointed out by the villagers, it seemed improbable that the whole of the drainage could be discharged at this point and investigation and levels show that this surmise was correct, for at a point about 3 miles above the crossing of the odai by the proposed channel, the Manodai in high flood spills over its left margin for a length of 400 feet and the spill escapes to the Periamorai odai, as marked on the survey by a blue wash; the relative levels between the two odais are shown by the line of levels.

† Named Audiodai in the Atlas sheet.

26. Consequently it is thought that the waterway to be provided for the aqueduct, if made equal to the average sectional wetted area of the odai, will be ample.

27. Accordingly an aqueduct of 4 spans of 15 feet, height of abutments and piers 7 feet, rise of arch 2½ is proposed, giving a total area of waterway of $130·5 \times 4 = 522$ square feet. The bed of the odai is sand over loose clay, which becomes firm at a depth of 7 feet.

28. For the foundations, a bed of concrete, 3 feet thick, is proposed, protected above and below by a row of wells sunk to a depth of 9 feet below floor into the clay and filled with concrete.

29. The work will be of carefully moulded bricks, pointed, the tops of the side walls will be protected by a coping of brick on edge of the form shown by the drawing; the concrete to be of broken bricks and made and mixed in the usual way.

30. The sectional area of the channel above and below the aqueduct for a depth of 2½ feet (O.F.S.L.) is 22½ square feet, the velocity being 1·43 feet per second. The sectional area of the duct has been reduced to 16 square feet at that depth (2½'). It may be remarked why not make the duct still smaller, *i.e.*, narrower and so reduce cost. This has been considered, but to do so would involve loss of head just at a point where even as laid out O.F.S.L in the channel is as low as it well can be placed with reference to the adjacent land to be supplied.

31. *Road bridges and old sluices at Veragalore.*—The channel will cross 3 roads. Road No. 19 near the 3rd mile from the head sluice, a bridge of 15-feet span, 3½ feet rise, and height of 3 feet of abutment now carries the road over the Nundyar channel, the mean width of the channel when improved will be 30 feet, and as there is no head to spare the full area of waterway must be provided; an entirely new bridge would be most satisfactory but as cost is an object, an additional 15-feet arch will answer.

Plan and estimate herewith.

32. Palayapadi road is crossed by the extension near the 2nd mile below the Kandradithum tank; a 9-feet culvert is here required; width of roadway to be 9 feet similar to existing road bridges.

Plan and estimate herewith.

33. About 4⅓ miles below the above tank road No. 15 is crossed; an eight-feet culvert is here provided for; design to be similar to the 9-feet one. These as will all the new masonry works be of pointed brick work neatly coped with brick on edge on all upper faces of walls.

Plan and estimate herewith.

34. Mr. Grimes' estimate provided 13 minor distribution sluices; these are considered quite unnecessary, as on a small channel of this kind the distribution will be in the hands of the ryots, who will provide the usual palmyra sluices; they should be located where the channel is in cutting.

35. So anxious are the ryots for the execution of the work that, in addition to giving up the required land, they have contributed a sum of Rs. 550* towards it.

* *Vide* copy of the Collector's letter No. 3/12, dated 12th February 1887, communicated by the Superintending Engineer with his endorsement No. 618 T.C., dated 14th February 1887.

36. Rs. 8,000 are provided† in this year's budget, so early sanction is requested to the general arrangements proposed.

† Omitted in the final issue.

Any alterations considered necessary can be subsequently carried out.

37. *Index map sent.*—To avoid delay of preparation no small scale index map‡ is sent, as the two taluk surveys are on different scales. Major Ryves' map, however, which accompanies, should suffice.

‡ A small scale index map however accompanied the estimates.

38. *Alternative to aqueduct.*—The relative cost of a cast-iron syphon compared with the aqueduct as estimated for has been considered.

Two pipes, 3 feet diameter each, would only give an area 14 square feet; about 108 feet of piping would be required; total weight for two pipes 40 tons at Rs. 150 per ton; cost Rs. 6,000 in addition to difficulties and cost of conveyance and fitting of the pipes.

Two-feet pipes would be a more manageable size; area of one pipe 3·14 square feet. By reducing the fall of the channel from the tank to the odai to, say, 2 feet per mile (instead of 3 feet) a head of 1½ feet at the aqueduct would be gained (channel so far should of course be made larger 5 feet bed width), so two such pipes would then suffice; weight some 26 tons; cost, say, Rs. 4,000 without the masonry cisterns which would be required and the extra cost of excavating a larger channel (to gain the required head) should be added.

So altogether the masonry aqueduct seems best adapted to the circumstances of an out-of-the-way locality of the kind.

39. *Head sluice.*—The head sluice is at present regulated by baulk shutters supported by a staging of 2″ square iron bars.

The sill is 3·35 feet below Nundyar anicut crest; vent is one arch of 23 feet span; 1½ feet sill to springing; rise of arch 5′ 9″.

With 3 feet in depth on the sill, the area of waterway is 67 square feet.

Nothing is provided in this estimate for fitting screw shutters to this sluice; a separate estimate can in ordinary course be sanctioned under repairs special, but it will be necessary to build two piers with a face wall between them and the abutments to close the upper parts of the arch; this will reduce the area of waterway, so it may be well to lower the sill by one foot, although this will then be a foot lower than the bed of the channel in rear can be placed (owing to slight fall available). The present sill of the sluice is a body wall 6 feet thick, built 4 feet above the floor proper of the sluice.

(Signed) J. C. LARMINIE,
Executive Engineer, Trichinopoly division.

15th April 1890.

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The estimates, as now submitted, amount to Rs. 42,690.

Taking the difference between the wet and dry assessment at Rs. 3 per acre, the additional revenue to be derived on 1,800 acres will be Rs. 5,400 or at about 13 per cent. on the proposed expenditure.

J.C.L.

1st May 1890.

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From the Collector of Trichinopoly, to the Superintending Engineer, VI Circle, dated 16th January 1891, No. 6-12.

In continuation of my letter No. 19-12, dated 16th April 1887, I have the honor to inform you that the balance of the contribution of Rs. 1,000 promised by the ryots concerned towards the extension of the Nundyar channel, Udayárpálaiyam taluk, has been collected and credited in the Taluk Treasury at Jayankondasholapuram. I have asked the Treasury Deputy Collector to withdraw the sum of Rs. 550 in the Savings Bank at Kilapaluvur and adjust it with the above sum to the credit of your department.

2. I request that you will be good enough to arrange to commence the work as early as possible.

No. 1302 T.C.

Copy submitted to the Chief Engineer for Irrigation, for information, in continuation of this office No. 1258 T.C., dated 17th January 1891.

(Signed) A. C. SMITH, Lieut.-Col., R.E.,
Superintending Engineer, VI Circle.

22nd January 1891.

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No. 46 I.

Submitted to Government with a recommendation that the estimate of Rs. 26,800 be sanctioned.

CHEPÂK,
4th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 13th March 1891, No. 245 I., Public Works.

The following estimate is sanctioned, Rs. 1,000 of the proposed outlay being met by contributions from the ryots concerned :—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Trichinopoly Division.
Original Works.

| | RS. |
|---|---|
| Extending Nundyar channel No. 166 of the list of "Imperial" works, estimate ... ... ... ... ... ... | 26,800 |

2. This sanction has been registered as No. 160 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
,, Superintending Engineer, VI Circle, with enclosures.
,, Examiner, Public Works Accounts.
,, Revenue Department.
,, Editors' table.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 13th.*

*Recd.* *Encl.*

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**G.O., 13th Mar. 1891, No. 245 I.**

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**MARCH.**

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**Nundyar Channel,**
**Trichinopoly Division**

Estimate of Rs. 26,800 for extending the —, sanctioned.

GOVERNMENT OF MADRAS

PUBLIC WORKS DEPARTMENT.

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**Irrigation.**
**Account.**

READ—the following paper :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 3rd February 1891, No. 2725 K.S.

I have the honor to submit, herewith, for sanction, an estimate, amounting to Rs. 4,680 for the Nallur channel and its branches, which takes off from the Bank canal, Western delta, at 34 miles 6 furlongs 478 feet.

2. This estimate is in supersession of the project estimate for Rs. 1,450 (see items 929 and 946 of revised statement of sanctioned estimates printed with G.O., No. 577 I. of 1st October 1888).

3. The excess of Rs. 3,230 over the original estimate is due to a new head sluice, a new channel and distributaries from it not allowed for in the project estimate.

The project estimate only allowed Rs. 200 for improvements and screw gearing to the existing sluice, but, owing to the diversion cut to be made at Penumudi, this channel will now take off from this cut and a new sluice is necessary. The project estimate only allowed for improving the existing channel; but, as this is now too low and large and as water has to be held up to command high land, which it was not then proposed or feasible to irrigate, a new channel has been provided which will be dug in the broad berm of the existing channel; the principal distributary runs along the toe of the Bank canal and picks up irrigation at present under spouts. The report and tracing from village map attached to estimate give all the further necessary information regarding this channel.

4. The project allowed for irrigating 2,500 acres under this channel, but, although the estimate now submitted provides for irrigating high lands, which could not be irrigated by the project channel, there is only 1,500 acres to be irrigated by the channel now estimated. The Division officer has gone carefully into the matter and has satisfied himself that this is all the land that can be irrigated.

5. In this connection I refer you to the last paragraph of my letter No. 2724 K.S., dated 3rd February 1891, forwarding estimate for Potumeraka channel.

## ENCLOSURES.

REPORT to accompany estimate for constructing Nallur sluice at 34 miles 6 furlongs 478 feet (canal mileage), Bank canal.

In the note accompanying G.O., No. 3572, dated 19th December 1874, it is stated that the sluice is serviceable and Rs. 200 only is provided for screw gearing for the shutter.

2. The sluice is now in a ruined state and is not of sufficient length for the canal bank which has since been raised in accordance with more recent orders.

3. In addition to this it is now proposed to divert the canal at this point on account of the encroachments made by the river.

4. Besides the vent for the Nallur channel a side vent is provided which will supersede the following existing spouts in the canal bank :—

| | | | | ACS. |
|---|---|---|---|---|
| 34 : | 5 : | 0 | ... ... ... ... ... ... ... ... | 7 |
| 35 : | 0 : | 440 | ... ... ... ... ... ... ... ... | 13 |
| 35 : | 5 : | 460 | ... ... ... ... ... ... ... ... | 13 |
| 35 : | 7 : | 540 | ... ... ... ... ... ... ... ... | 150 |
| 36 : | 5 : | 160 | ... ... ... ... ... ... ... ... | 20 |

*Old masonry sluice.*—The channel from the side vent will tail into Lingiah channel and Lingiah sluice will be removed.

(Signed) J. E. PAUL,
Executive Engineer, Kistna Western division.

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REPORT to accompany estimate for Nallur channel and branches.

A provision of Rs. 1,450 is provided in the completion project for this channel (para. 15 of the note printed in G.O., No. 3573 of 19th December 1874).

2. This channel is also referred to in para. 41 of the same note.

3. The tank therein referred to has since been sold, but land has been reserved for the channels now proposed.

4. A copy of the specification report to accompany the original estimate for Rs. 1,450 is attached.

5. The present estimate provides for improving the old Nallur tank channel, a river supply channel, which was allowed for in the original estimate, as well as for two branches;* the first will run as a parallel channel along the outside of the right † bank of the Bank canal for 2 miles 3 furlongs and 150 feet and will supersede four dangerous spouts and an old sluice.

* Which were not allowed for in the "original" or project estimate.
† Originally.
(Intld.) J.H.

6. The increase in the estimate for the Nallur channel is due to the water having to be carried at a higher level + 13 instead of 11·3 at the head, datum 43 feet below anicut crest. The F.S.L. of the Bank canal has been raised at this sluice from + 12·53 to 15·5 by the construction of Mortota lock and all the higher land near the Bank canal which it was not originally intended to irrigate is now irrigated.

7. The discharges and position of the works are given on the plans.

8. The irrigable area in 1889-90, which was supplied by these channels, was 1,020 against the ultimate being 1,500.

9. The Nallur channel is excavated afresh ‡ and not taken along the old course, as the latter is very broad and it would not be possible to keep the full supply required if the old channel was retained; by this alteration § about 8 acres of land that is now in the lunka will be sold and will probably realise Rs. 800.

‡ A new channel is dug in the broad berm of the existing channel.
§ It could be sold in any case.
(Intld.) J.H.

(Signed) J. E. PAUL,
Executive Engineer, Kistna Western division.

8th January 1891.

ESTIMATE form—Abstract—Classified.

| Sub-head. | Names of works. | Amount of estimate for individual work. | Total of sub-heads. | Total for each canal or distributary. | Total of each main head. | Remarks. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | MAJOR WORKS (CONSTRUCTION). | RS. | RS. | RS. | RS. | |
| | 49. IRRIGATION. | | | | | |
| | *Kistna Delta System, Western Section.* | | | | | |
| | I. Works. | | | | | |
| | Bank Canal. | | | | | |
| | (3) Distributaries. | | | | | |
| C. Works .. | 1. Head sluice for Nallur channel .. | 1,680 | | | | |
| | 2. Drop at 1 mile and 7 furlongs of Nallur channel .. .. .. | 270 | | | | |
| | 3. Drop at 100 feet below head of No. 2 branch of Nallur channel .. | 260 | | | | |
| | Total, C. Works .. | .. | 2,210 | | | |
| L. Earthwork. | 4. Nallur channel .. .. .. | 1,400 | | | | |
| | 5. No. 1 branch of Nallur channel .. | 570 | | | | |
| | 6. No. 2 do. of do. .. | 290 | | | | |
| | Total, L. Earthwork .. | .. | 2,260 | | | |
| O. Miscellaneous .. | 7. Demarcation stones to Nallur channel. | 160 | | | | |
| | 8. Do. No. 2 branch of do. .. | 50 | | | | |
| | Total, O. Miscellaneous .. | .. | 210 | | | |
| | Total, Main head or (3) Distributaries. | .. | .. | 4,680 | 4,680 | |

(Signed) J. E. PAUL,
Executive Engineer, Kistna Western division.

8th January 1891.

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ORDER—dated 13th March 1891, No. 246 I., Public Works.

The estimate, amounting to Rs. 4,680, for the Nallur channel and its branches, which takes off from the Bank canal, Kistna Western delta, is sanctioned in lieu of the provision of Rs. 1,450 made for this channel in the classified abstract estimate (*vide* items 929 and 946 printed in Proceedings of the Madras Government, No. 577 I., dated 1st October 1888), the excess of Rs. 3,230 being met from the balance of the lump sum provided for unforeseen works of the Kistna delta system, which will then be reduced to Rs. 2,77,923.

2. This sanction has been registered as No. 161 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

Govt. of {1891} Madras.

PUBLIC WORKS.

*Dated March, 13th.*

*Recd.* *Encl.*

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**G.O., 13th Mar. 1891, No. 246 I.**

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**MARCH.**

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**Nallur Channel,**
**Kistna Western Delta**

Estimate, amounting to Rs. 4,680, for the — and its branches, sanctioned with remarks.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper :—

No. 52 I.

*Note by the Chief Engineer for Irrigation.*

Endorsement from Superintending Engineer, I Circle, dated 21st February 1891, No. 1232 G.N.
Letter from Superintending Engineer, IV Circle, dated 18th February 1891, No. 34 E.I.
Letter from Superintending Engineer, V Circle, dated 5th March 1891, No. 83 E.I.
Letter from Superintending Engineer, V Circle, dated 6th March 1891, No. 84 E.I.
Letter from Superintending Engineer, V Circle, dated 7th March 1891, No. 87 E.I.
Letter from Superintending Engineer, V Circle, dated 9th March 1891, No. 89 E.I.

With reference to the marginally-noted applications for modifications of allotments recently received from Superintending Engineers who should have submitted the applications earlier, the following transfers of funds are recommended for sanction under Provincial, 43. Minor works and Navigation :—

*From*

Irrigation and Navigation.
Works for which Capital and Revenue Accounts are kept.
Capital Account.
South Arcot Division.
Pelandorai Anicut System.

| | RS. | RS. |
|---|---|---|
| Works ... ... ... ... | 1,078 | |
| Establishment ... ... ... | 248 | |
| | | 1,326 |

Revenue Account.
South Arcot Division.
Shatiatope Anicut System.

| | RS. | RS. |
|---|---|---|
| Maintenance and repairs ... | 8,000 | |
| Establishment ... ... ... | 1,725 | |
| | | 9,725 |

Tirukoilúr Anicut System.

| | RS. | RS. |
|---|---|---|
| Maintenance and repairs ... | 4,000 | |
| Establishment ... ... ... | 690 | |
| | | 4,690 |

Ganjam Division.
Chilka Lake Canal.

| | RS. | RS. |
|---|---|---|
| Maintenance and repairs ... | 1,440 | |
| Establishment ... ... ... | 331 | |
| Tools and plant ... ... | 31 | |
| | | 1,802 |

Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
South Arcot Division.

| | RS. | RS. |
|---|---|---|
| Veedur tank ... ... ... | 1,000 | |
| *Coimbatore Division (Salem District).* | | |
| Amanitalava or Panchapully tank and channel, improving. | 270 | |
| Minor original works ... | 130 | |
| *Kistna Eastern Division.* | | |
| Minor original works ... ... | 1,409 | |
| | | 2,809 |

*To*

Irrigation and Navigation.
Works for which Capital and Revenue Accounts are kept.
Revenue Account.
South Arcot Division.
Pelandorai Anicut System.

| | RS. | RS. |
|---|---|---|
| Extensions and improvements. | 1,000 | |
| Establishment ... ... ... | 230 | |
| | | 1,230 |

Shatiatope Anicut System.

| | RS. | RS. |
|---|---|---|
| Extensions and improvements. | 500 | |
| | | 500 |

Tirukoilúr Anicut System.

| | RS. | RS. |
|---|---|---|
| Extensions and improvements. | 1,000 | |
| | | 1,000 |

Chingleput Division.
Madras Water-supply and Irrigation Extension Project.
Maintenance and Repairs.

| | RS. | RS. |
|---|---|---|
| Tamarapak anicut, repairing first apron ... ... ... | 3,000 | |
| Establishment ... ... ... | 690 | |
| | | 3,690 |

Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
South Arcot Division.

| | RS. | RS. |
|---|---|---|
| Repairs ... ... ... | 10,000 | |
| | | 10,000 |

Chingleput Division.

| | RS. | RS. |
|---|---|---|
| Minor original works ... ... | 1,400 | |
| Repairs ... ... ... | 3,000 | |
| | | 4,400 |
| Establishment ... ... ... ... | | 2,666 |
| Tools and plant ... ... ... | | 174 |

| *From* | RS. | RS. | *To* | RS. | RS. |
|---|---|---|---|---|---|
| Tank Restoration Works. South Arcot Division. | | | Tank Restoration Works. South Arcot Division. | | |
| Minor original works ... | 1,000 | | Repairs ... ... ... | 1,000 | |
| Chingleput Division. | | | Chingleput Division. | | |
| Minor original works ... ... | 6,000 | | Repairs ... ... ... | 6,000 | |
| | | 7,000 | | | 7,000 |
| Agricultural Works. Tanjore Division. | | | Agricultural Works. Tanjore Division. Repairs. | | |
| Vettár river straight cut ... | 1,000 | | River embankments ... ... | 2,000 | |
| Diverting Chinnar surplus ... | 1,000 | | | | 2,000 |
| South Arcot Division. | | | | | |
| Malatar channel extensions ... | 1,000 | | | | |
| Reserve. | | | | | |
| Original works ... ... | 1,657 | | | | |
| | | 4,657 | | | |
| Establishment ... ... ... ... | | 611 | | | |
| Tools and plant ... ... ... | | 40 | | | |
| Grand total ... | | 32,660 | Grand total ... | | 32,660 |

2. The Superintending Engineer, II Circle, surrendered* Rs. 2,000 from the grant for minor original works and Rs. 2,000 from that for repairs under Irrigation and Navigation Works for which neither Capital nor Revenue accounts are kept in the Kistna Eastern division, but only Rs. 1,409 of these surrenders are required to meet the demands made for other division. The balance of the surrenders cannot be withdrawn and the Superintending Engineer should treat it as part of the grant and in reporting on short outlay after the close of the current official year explain the circumstances under which the grants could not be fully utilized.

* His telegram No. 78, dated 3rd March 1891.

CHEPÂK,
11th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 13th March 1891, No. 247 I., Public Works.

The modifications of allotments proposed by the Chief Engineer for Irrigation are sanctioned.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, I Circle.
„ „ „ II „
„ „ „ IV „
„ „ „ V „
„ Examiner, Public Works Accounts.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March*, 13*th*.

*Recd.* *Encl.*

**G.O., 13th Mar. 1891, No. 247 I.**

**MARCH.**

**Modification of Allotments**

The — proposed by the Chief Engineer for Irrigation, sanctioned.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

Irrigation,
Account.

READ—the following paper:—

From Major D. McN. CAMPBELL, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 24th February 1891, No. 72 E.I.

I have the honor to submit, for sanction, an estimate of Rs. 4,040 for constructing stone revetment to Avanipoor tank in Tindivanam taluk, South Arcot district.

2. The necessity for the work is fully explained in the report accompanying the estimate.

ENCLOSURE.

REPORT to accompany the estimate for constructing stone revetment to Avanipoor tank, I.L. No. 26 in Tindivanam taluk; amount of estimate Rs. 4,040.

The tank was completely repaired in 1888-89 at a cost of Rs. 4,045 and the necessary surplus requirements and sluices have also been carried out.

The front slope of the bund from the southern weir to the place where it once breached is much cut up and exposed to the north-east monsoon. It is, therefore, proposed to build a revetment, as shown in the section, to protect the same.

The tank belongs to Royanellore Madoovoo group and has 8 up-tanks to it. It is the largest in the group, with a drainage area of 18 square miles. The ayacut under the tank is 631 acres, yielding a revenue of Rs. 2,470.

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ORDER—dated 13th March 1891, No. 248 I., Public Works.

The following estimate is sanctioned:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
South Arcot Division.
Original Works.

| | RS. |
|---|---|
| Constructing stone revetment to Avanipoor tank No. 26 in list of "Imperial" works, estimate ... ... .. ... | 4,040 |

2. This sanction has been registered as No. 162 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle, with eight enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' table.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 13th.*

*Recd.* *Encl.*

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**G.O., 13th Mar. 1891, No. 248 I.**

---

**MARCH.**

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## Avanipoor Tank, South Arcot Division.

Estimate of Rs. 4,040 for constructing stone revetment to —, sanctioned.

# GOVERNMENT OF MADRAS.

# PUBLIC WORKS DEPARTMENT.

## Irrigation.

READ—the following paper:—

### INSPECTION NOTES, 18TH—21ST FEBRUARY 1891.

*Kistna district—Eastern section of the delta.*

The visit to the Kistna district, which these notes deal with, was not made with the object of a general inspection, but with special reference to decision of a question as to the way in which flood-gates in connection with the "West Tammileru escape" were to be provided. The opportunity, however, was seized of inspecting other works on the way.

2. *East Tammileru or Chattaparu escape.*—The unsatisfactory way in which the shutters and gearing for this had been carried out was noticed in inspection notes of January—February 1890 (with Proceedings of the Madras Government, No. 193 I., dated 24th March 1890); they have now been put right as far as possible without going to the great expense of entirely new and stronger shutters and gearing with larger screw shafts. The shutters have 6 feet of water against them and bend, and the Superintending Engineer will take into consideration and report on a proposal to reduce the height of the shutters to 4 feet by building under them a body wall to 4 feet below F.S.L. If advisable for scouring, a few of the vents might be left as they are, shutters in them being braced with L or T iron. It will be well to supply to each of the gearing screw boxes a standing capstan head with three sockets to take movable iron bars, of which 3 *sets* should be kept with the establishment which works the escape; by this means opening can be done much more quickly than now.

3. *West Tammileru escape.*—On last inspection the unsatisfactory way in which the shutters and gearing of this work had been fixed was also commented on; with great personal attention, Mr. Jopp has put matters right as far as may be. It will be well to here provide capstan heads, &c., such as noted above. It has been decided to put stop gates just below this work, to be shut when floods come down the Tammileru, and so prevent the serious silting up of the reach below the work which now results from every flood and stops navigation for considerable periods before it can be cleared out. The absolute location of these gates and the arrangements connected with them required careful consideration and this having been given on the spot instructions were written.

4. *New bridge, 56-feet span, across Ellore canal near Bezváda.*—Up to springing—*cut-stone* skew backs not allowed for in plan or estimate have been wisely provided. No bricks fit for turning so large an arch have been made or are at once procurable; carefully moulded, thoroughly burnt, compact bricks alone must be used; even if in order to get them the turning of the arch has to be deferred till next year's closure—a delay which, it is hoped, will not be necessary.

5. Not much, if anything, has been done to carry out the instructions in last inspection notes 13 (*a*) about *improvements at the head of the Ellore canal.* An appreciable amount of the silting which causes such trouble in the first mile of this canal is due to the large quantities of earth carried in from the spoil bank and broad berm on the right side, as attested by the many large ragged rain gullies in that berm. The spoil must be trimmed to shed the rain which falls on its top to its rear, and the berm should be sloped away from the canal with a broad paved drain along the toe of the spoil bank, from which at convenient places paved drains should lead into the canal.

6. *Quarries.*—The unsatisfactory state of the one at the Mogalrazapuram hill was noticed at last inspection. Matters have now been made much better, but still the tramway and loading place remain very imperfect and it was decided that their improvement should be carried out without delay.

7. *Ryves' canal head alterations.*—The *widening* is going on rapidly; the *bridge* foundations are out and the concrete ought to be put in at once; for the *new regulator* the foundations are excavated to floor level and there is no reason to doubt that the work will be quite ready by the reopening of the canals. The shutters of the old work have proved to require extensive repair not foreseen or provided for in estimate. What is necessary should be carried out at once; the old friction wheels which proved quite useless for the purpose intended and which caused extensive leakage should be removed.

8. *The raising of the crest of the anicut* and fitting on it grooved iron posts to take boards referred to in para. 1 (*a*) of last inspection notes is in progress and nearly all the posts have been received from Madras. A stone slab with the following inscription will be let into the concrete crest:—

"Crest raised one foot with concrete, and C.I. posts fixed, 1891."

9. *Workshops.*—The improvement in the arrangement, management and general working of these during the last few months reflect great credit on the Executive Engineer Mr. Jopp and Sergeant J. S. Joyce, the Superintendent of the Workshops.

10. Mr. Jopp was selected just a year ago for charge of this most important division and he has already thoroughly justified that selection. The beneficial result of the close personal attention which he devotes to his duties is evident in all connected with the division under his charge.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

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No. 48 I.

Submitted to Government.

CHEPÂK,
7th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 13th March 1891, No. 249 I., Public Works.

Communicated, for information and guidance, to the Superintending Engineer, II Circle.

2. His Excellency the Governor in Council notices with pleasure the favorable testimony borne by the Chief Engineer for Irrigation to the efficiency of Mr. Jopp, the Executive Engineer in charge of the Kistna Eastern division.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.

Govt. of {1891} Madras.

PUBLIC WORKS.

*Dated March, 13th.*

*Recd.* *Encl.*

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**G.O., 13th Mar. 1891, No. 249 I.**

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**MARCH.**

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## Inspection Notes

Communicating to the Superintending Engineer, II Circle, the — of the Chief Engineer for Irrigation of the Eastern section of the Kistna delta and noticing with pleasure the favorable testimony borne by the Chief Engineer to the efficiency of Mr. Jopp, Executive Engineer in charge of the Kistna Eastern division.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.

READ—the following paper :—

REPORT of progress of works in No. II Periyár division for the month of February 1891, No. 263.

*I Reach—Masonry.*—The head and scouring sluices have made fair progress during the month. The arches may be said to be completed for both works. The right wing and abutment of the head sluice have been built up to the level of the extrados of the arch and the rear face wall raised to the level of the bottom of the parapet. The rear face wall of the scouring sluice has been commenced and the right wing extension to the anicut raised 7½ feet. Angle irons are being fixed.

The Vadagarai head sluice was commenced about the middle of January. The work has now been completed to floor level. Two works, viz., fall and bridge, 2½ miles, and the culvert at 2 miles 7 furlongs, have been completed in the month, but the final bills have not been paid. They will be during this month. There are two bridges under construction in the I Reach. The first, at 1½ miles, has had the abutments and piers brought up to the springing line ; the second, in the bed of Ramarajapuram tank, has not been begun owing to the water in the tank. The two culverts in the Mettaparai fields have not been recommenced owing to the water in the channel.

*Ramarajapuram surplus sluice.*—The body wall has been completed to full length except a short portion where the cut-stones for the crest have not been laid. The work will now be pushed on rapidly, the Chief Engineer having ordered the old plan to be adhered to. All material has been collected at the work-site.

As regards the excavation, the contractor has done very little. Some 500 cubic feet of stones has been blasted and portions of the slopes of the channel cut in the third mile. No payments have been made. The time expires on the 31st instant, and the Chief Engineer will not renew the contract. This I have notified to the contractor.

Stone revetment is being built to the front face of Natchikulam tank; about one-third of the total length completed.

*II Reach.*—In this reach the first and fourth cross drainage works have been completed. The second and third were recommenced at the commencement of the month and are being pushed on. Every endeavour will be made to complete them in the dry weather, but the progress during the year has been most unsatisfactory. A little has been done towards closing the gaps, but the total amount of earthwork done in this reach during the month is probably under Rs. 500.

Why? If it is the fault of the contractor, fine him, if practicable.

(Intld.) J. W. M.

*III Reach.*—The three sluices and three occupation bridges have been almost completed; will be by the end of the official year. All the seven cross drainage works have made very good progress.

In the first only half the coping remains to be done; the rest has been completed. The work will be finished by the 15th instant. Part of the flooring and parapet walls only remain to be done in the second, third and fourth works. In these the channel is carried under the drainage of the country.

The fifth work, an aqueduct, the channel is carried over the drainage, is completed except the coping to the left parapet wall.

The sixth and seventh works were sanctioned some time after the others, but the former will probably be finished in this official year. Very little earthwork has been done; all available labor has been concentrated on the masonry works.

The progress of both earthwork and masonry in the IV and V Reaches has been very slow. The only masonry work in the IV Reach now under construction is the culvert at 17 miles 3 furlongs and the centring is being turned. A few coolies only have been employed on the earthwork in this reach and in the V.

The Shattiyar cross drainage work was commenced in January, and this is an exception to the very slow progress in the D sub-division, for the work has been pushed on vigorously owing to the energy of the contractor. The abutments have been brought to full height and will be ready for the centring this month.

There are two bridges situated at 18 miles 5 furlongs and 19 miles 4 furlongs respectively. The brick arch is being turned in the first work; foundations excavated for the second.

Owing to the failure of the earthwork contractor and the small quantity of work turned out in the D sub-division, I have been obliged to open out the VI and VII Reaches.

In the first of these, stone has been collected for the culverts at 21 miles 4 furlongs and 21 miles 7 furlongs and also for the bridge in 22nd miles, as well as for the super-passage under the Kodaikal odai in the 24th mile. Some 500 coolies have been daily employed on the earthwork of this reach during the month and good progress has been made.

In the VII Reach, 200 coolies were daily employed on the earthwork, but the number is now rapidly increasing. The IX and X Reaches are being set out, and the line will be continued to the end of the XII Reach which is the end of the channel. This will probably be done by the middle of next week.

*Branch channels.*—The final bill for the first has been paid, and that for the second will, I hope, be paid this month.

The excavation of the third branch channel has been almost finished, but some small masonry works have to be completed. For the fourth branch channel, which constitutes the E sub-division, the earthwork has made fair progress, but the drops and sluices have only just been commenced.

There was heavy rain between the 13th and 18th of the month; nearly $3\frac{1}{2}$ inches were registered at Peranay during these five days. This caused some of the excavation to be flooded and delayed work, especially in portions of the I Reach.

The number of work people of all sorts employed daily was between 2,500 and 3,000, but the numbers showed a tendency to increase towards the end of the month, and I have no doubt that the numbers next month will be very much greater.

There has been no sickness or accidents.

METTUPATTY, (Signed) G. P. CARLESS,
7th March 1891. Executive Engineer, No. II Periyár Division.

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No. 227 P.R.

Copy submitted to the Chief Engineer, Public Works Department.

2. In order that the allotment for the year may be fully utilized, the Executive Engineer has been authorized to proceed with other sanctioned works for which there are no allotments and to submit the required application for modification of allotments.

(Signed) J. W. MARTIN,
9th March 1891. Offg. Suptg. Engineer, VI Circle.

Order—dated 17th March 1891, No. 255 I., Public Works.

Recorded and a copy forwarded to the Government of India in continuation of this department endorsement No. 243 I, dated 13th March 1891.

(Here enter No. 256 I., dated 17th March 1891.)

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, VI Circle.
" Chief Engineer for Irrigation.
" Revenue Department.

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Endorsement—dated 17th March 1891, No. 256 I., Public Works.

Forwarded.

(By Order)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 17th.*

*Recd.* *Encl.*

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**G.O., 17th Mar. 1891, Nos. 255 I., 256 I.**

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**MARCH.**

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## Progress Report

Forwarding copy of — of works in No. II Periyár Division for February 1891.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

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**Irrigation.**

READ—the following papers:—

Extract from inspection notes of J. C. LARMINIE, Esq., Executive Engineer, Bellary, for December 1890.

* * * * *

8. *Locherla tank* (*8th December* 1890).—This, though classed as minor, is a beautiful tank, about 3 miles west of No. 27 (Bukkapatnam). The bund is high and the weir the same, so the reconstruction of the weir must be carried out by this department. The foundation is rock and on this was erected a flimsy body wall, about 15 feet in height, built of stone in mud, with a front masonry skin.

The usual idea of support was given by rough stone aprons, but, as might have been expected, when the water rose over it in 1889, a big gap was washed out of the middle, owing, it is believed, to the sheer inadequacy of the wall to stand the head of water.

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No. 2832.

Submitted to the Chief Engineer for Irrigation for obtaining the transfer of the tank to Imperial.

BELLARY,
24th Dec. 1890.

(Signed) H. SMALLEY, Colonel, R.E.,
Superintending Engineer, III Circle.

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Memo. to the Superintending Engineer, III Circle, dated 10th January 1891, No. III/1 A.N.

Letter from the Superintending Engineer, III Circle, dated 31st January 1891, No. 3122, with copy of letter, dated 27th January 1891, No. 4386, from the Executive Engineer, Bellary division.

Letter to the Collector of Bellary, dated 3rd February 1891, No. 7 B.L.

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From O. WOLFE-MURRAY, Esq., Acting Collector of Anantapur, to the Chief Engineer for Irrigation, dated Anantapur, 2nd March 1891, M.R. No. 116.

In reply to your letter No. 7 B.L., dated the 3rd ultimo addressed to the Collector of Bellary and subsequently sent to me for opinion by him, I have the honor to bring to your notice that the tank of Locherla, Penukonda taluk, is in this district and not in Bellary. I have last week inspected the same and am entirely in favor of its transfer from minor to Imperial. I would suggest that the porous bund, separating Locherla tank from Mariappa kunta, which has no ayacut of its own, be removed and the two tanks formed into one as suggested by the Head Assistant Collector.

2. With regard to the concluding portion of your letter, I would explain that some portion of land, though classed as dry and consequently not forming the ayacut of the tank, was cultivated with wet crops by the water of the tank and included in the total area cultivated; hence the excess of irrigated area over the actual ayacut of the tank.

---

No. 55 I.

Submitted to Government with a recommendation that the following additions be made in the list of Imperial works, Anantapur district, communicated with G.O., No. 407 I., dated 6th July 1887:—

| Taluk. | Number. | Source of supply. | Name of group or system. | Name of tank. | PRESENT IRRIGATION. | | TOTAL. | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Area. | Revenue. | Area. | Revenue. |
| | | | | | ACS. | RS. | ACS. | RS. |
| Penukonda .. | 27-A. .. | Rain-fed. | Tank group .. | Locherla .. | 210 | 946 | 210 | 946 |

CHEPÂK,
12th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 17th March 1891, No. 257 I., Public Works.

The proposal of the Chief Engineer for Irrigation is sanctioned.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
,, Superintending Engineer, III Circle.
,, Examiner, Public Works Accounts.
,, Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 17th.*

*Recd.* *Encl.*

---

**G.O., 17th Mar. 1891, No. 257 I.**

---

**MARCH.**

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## Locherla Tank

The proposal of the Chief Engineer for Irrigation to add the — to the list of Imperial works in the Anantapur district, sanctioned.

GOVERNMENT OF MADRAS.

# PUBLIC WORKS DEPARTMENT.

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**Irrigation.**
**Account.**

READ—the following paper:—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 22nd January 1891, No. 572 N.L.

I have the honor to forward, herewith, estimates, amounting to Rs. 4,120, countersigned by the Collector, for improvements to Bramanakraka-Krakamma tank and supply channel, Imperial No. 53, Nellore district, and to request that sanction of Government may be obtained for the same.

2. The report accompanying the estimate will explain the necessity for the work and the particulars of revenue, &c., are given in the statement of hydraulic details.

3. This tank has an ayacut of 565 acres, out of which 183 acres are held by shrotriemdars, who have presented a kyphiet before the Head Assistant Collector, agreeing to pay one-fourth share of the estimated cost of the improvements within one year after the work is completed.

4. I observe from Code para. 1341-A that prepayment of contribution is necessary before a work is put in hand.

5. I am of opinion that shrotriemdars should pay a proportionate share of the estimated cost according to the area held by them out of the ayacut of the tank, *i.e.*, one-third.

---

ENCLOSURE.

REPORT to accompany the plans and estimates for the improvements of Bramanakraka-Krakamma tank.

| | RS. |
|---|---|
| Amount of estimate ... ... ... ... ... ... ... | 4,120 |
| Date of last repairs ... ... ... ... ... ... | Not known. |
| Cost of do. ... ... ... ... ... ... | |

NOTE.—In the list of Imperial tanks the name of the tank has been misprinted as "Bramanakraka-Krakamnia" instead of Bramanakraka-Krakamma, No. 53.

This tank is an isolated one and receives the drainage from a catchment area of 3 square miles, which amounts to 936 cubic feet a second, and it also receives a supply from Chinakraka tank surplus channel by a branch channel (117 cubic feet per second), so that the total discharge is 1,053 cubic feet. The branch channel is much silted up and its clearance is very necessary for the better supply of Bramanakraka-Krakamma tank. This source of supply, viz., from Chinakraka surplus channel is a most useful one as there is generally water flowing away from the fields and this can be turned into the tank when there is insufficient rain. At present the flow of water is very slow, but, if the channel is deepened, there will be a natural flow, which there is not at present except in flood time. The total discharge 1,053 cubic feet a second will be discharged from the proposed weir 82 feet in length with 2·5 feet of water passing on the crest. The old weir is only 48 feet long and is in a tumble-down state and cannot be repaired; it will therefore be demolished.

The tank is a shrotriem one and shrotriemdars will have to pay their portion of the cost of the proposed improvements.

The bund of the tank is very badly worn away owing to no repairs having been carried out for a long period. There was a revetment originally, but it has now almost entirely disappeared, and, in consequence, the bund is to be protected by planting vidavali grass. The heads of the two sluices are in a leaky state and are to be remodelled. It is hoped by improving the tank and supply channel that the cultivation under the tank will be increased to its proper extent which has lately fallen off owing to the insufficiency of the supply.

H. H. O'CONNELL,
Executive Engineer, Nellore Division.

16th June 1890.

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ORDER—dated 17th March 1891, No. 258 I., Public Works.

| | | RS. |
|---|---|---|
| Works | ... | 1,030 |
| Establishment at 23 per cent. | ... | 237 |
| Tools and plant, 1½ | ... | 15 |
| | Total ... | 1,282 |

The following estimate is sanctioned, one-fourth of the estimated cost of the improvements, viz., Rs. 1,282, as shown in the margin, being contributed by the shrotriemdars concerned:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Nellore Division.
Original Works.

| | RS. |
|---|---|
| Improvements to Bramanakraka-Krakamma tank and supply channel, No. 53 of list of "Imperial" works, estimate ... ... ... | 4,120 |

2. This sanction has been registered as No. 163 I. of 1890-91.

3. The Superintending Engineer, II Circle, will note that, under para. 1341 of the Public Works Code, the contribution promised by the shrotriemdars must be paid before the work is put in hand.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with five enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' Table.

IRRIGATION.
ACCOUNT.

Govt. of {1891} Madras.

# PUBLIC WORKS.

Dated March, 17th

Recd. Encl.

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**G.O., 17th Mar. 1891, No. 258 I.**

---

**MARCH.**

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## Bramanakraka-Krakamma Tank

Estimate of Rs. 4,120 for improvements to — and supply channel, Nellore division, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation:
Account.

Read—the following paper :—

No. 51 I.

*Note by the Chief Engineer for Irrigation.*

This is yet another case * of considerable excess over estimate in the Kistna district which appears not to have had the Superintending Engineer's attention till submission of the completion report.

* See P.M.G. No 625 I, dated 4th Nov. 1890.
" " 675 I, " 19th " "
" " 696 I, " 27th " "
" " 733 I, " 8th Dec. "
" " 768 I, " 19th " "

2. The chief part of the excess which cannot be satisfactorily explained appears to have been due to the shortcomings of the Bezváda workshops which supplied and put up the wood-work of the roofs; the Executive Engineer, in whose charge the workshops then lay, is now dead, and the Superintendent of those shops has been moved.

Chepâk,
10th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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Order—dated 17th March 1891, No. 259 I., Public Works.

The Examiner of Public Works Accounts is authorized to pass the outlay incurred in constructing the Executive and Assistant Engineer's quarters at Duggirala, the excess outlay, aggregating Rs 1,083, being met from the balance of the lump sum provision available for unforeseen works of the Kistna Delta system which will then be reduced to Rs. 2,76,840.

2. This sanction has been registered as No. 164 I. of 1890-91.

3. The attention of the Superintending Engineer is again drawn to the frequency of considerable excesses over estimates in the Kistna district and to the necessity for more attention on his part to paras. 255, 261, 953 and 954 of the Public Works Code.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle, with three enclosures.
" Examiner, Public Works Accounts.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 17th.*

*Recd.* *Encl.*

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**G.O., 17th Mar. 1891, No. 259 I.**

---

**MARCH.**

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## Quarters at Duggirala

Authorizing the Examiner, Public Works Accounts, to pass the excess outlay incurred in constructing — for the Executive and Assistant Engineers.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.
### Account.

READ—the following paper :—

From G. D. WYBROW, Esq., Superintending Engineer, I Circle, to the Chief Engineer for Irrigation, dated Dowlaishweram, 18th February 1891, No. 1220 G.N.

I have the honor to forward, herewith, the following estimates connected with the Loharakhandi river embankment in the Rushikulya division and to request that you will accord sanction to the same :—

| | Estimate. |
|---|---|
| | RS. |
| (1) Special repairs to Loharakhandi river right embankment ... | 3,050 |
| (2) Extending Loharakhandi river right embankment ... ... | 3,200 |

2. You will observe from the report attached to the above estimates that the first work is chargeable to "43. Minor Works and Navigation, Agricultural Repairs," and the second work is chargeable to Head works, C. Works of the Rushikulya project, the amount of estimate for this work having been included in the lump sum of Rs. 6,400 provided in the revised estimate of the project—*vide* G.O., No. 482 I., dated 4th September 1890.

3. The estimate for the first work will be sanctioned by me after your approval, and I request your sanction to the second one.

---

ENCLOSURE.

REPORT to accompany estimate for extending and improving the Loharakhandi river right embankment above Goomsur anicut.

An embankment along the right bank of the Mahanadi river is already in existence, but it is too weak and low to suit the altered conditions caused by the construction of the Goomsur anicut.

2. The maximum flood of November 1889 at the site of the anicut rose to M.S.L. + 195·7, and the Superintending Engineer, in his inspection notes of May, suggests that + 196·5 should be taken as a possible maximum flood level.

3. It has been calculated that the Goomsur anicut will raise this level by 3′ or to + 199·5.

4. Assuming a fall of 6′ per mile for the river bed above the anicut, the backwater will extend for 6 furlongs.

5. Therefore from the head sluice to a point 6 furlongs higher up the bank has been made 6′ wide at top, and the top 6′ above M.F.L. Front and rear slopes 2 to 1.

6. From 6 furlongs upwards the top of the bank will be level (+ 207·00) until it reaches a point which is 3′ above the M.W.L. of November 1889, and above this point the bank will be repaired in the usual way and from proper funds.

7. The soil, of which the bank has been made, is nearly pure sand. It has been found that it will not stand at a less slope than 2 to 1, and further that turfing is necessary. The extra cost caused by the increased section of the bank will be met from the saving on earthwork which will be effected on account of the light nature of the soil.

8. A portion only of the work is entirely new. The estimate therefore has been divided into two portions. When the earthwork is entirely new, it is considered chargeable to the

Project funds; but when the already existing bank has been raised and improved, the expenditure appears reasonably chargeable to 43. Minor Works and Navigation Agricultural Repairs.

9. The bank is about three-fourths complete and will be finished before the end of the current official year.

KHANDRAVALLI,
29th January 1891.

(Signed) W. C. DEMORGAN,
Executive Engineer, Rushikulya Division.

---

No. 50 I.

Submitted to Government with a recommendation that the estimate of Rs. 3,200 for extending the embankment be sanctioned from the amount at present available for unforeseen works of the Rushikulya project, which will then be reduced to Rs. 16,258.

2. The estimate for repairing the embankment has been returned to the Superintending Engineer duly approved for sanction under Agricultural—Repairs, River Embankments.

CHEPÂK,
7th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 17th March 1891, No. 260 I., Public Works.

The following estimate is sanctioned from the source indicated in foregoing endorsement of the Chief Engineer for Irrigation:—

Famine Relief and Insurance.
35. Construction of Protective Irrigation Works.
Rushikulya Project.
I. Works.
(1) Head Works.
C. Works.

| | RS. |
|---|---|
| Extending the Loharakhandi river right embankment above the Goomsur anicut—estimate ... ... ... ... ... ... | 3,200 |

2. This sanction has been registered as No. 165 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle, with two enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 17th.*

*Recd.* *Encl.*

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**G.O., 17th Mar. 1891, No. 260 I.**

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**MARCH.**

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**Loharakhandi River**

Estimate of Rs. 3,200 for extending the — right embankment above the Goomsur anicut, sanctioned.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.

READ—the following paper :—

Proceedings of the Government of India, Public Works Department (Civil Works —Irrigation), dated Calcutta, 5th February 1891, No. 21 I.

*Read*—

Administration report of irrigation works in the Madras Presidency for 1889-90.

*Observations.*—The number of major and minor works in the Madras Presidency for which capital and revenue accounts were kept during 1889-90 was 17, exclusive of the Vedarniem canal, the capital account of which has not been made up yet. Of these, 10 are major works and 7 are minor works. The capital outlay on each class of works during and up to the end of 1889-90 was as follows :—

| — | Number of works. | During the year 1889-90. | | | | | | | Total direct and indirect to end of 1889-90. |
|---|---|---|---|---|---|---|---|---|---|
| | | Works. | Estab-lish-ment. | Tools and plant. | Suspense account. | Total direct charges. | Indirect charges. | Total direct and indirect charges. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| *Major works.* | | RS. | RS. | RS. | RS. | RS. | RS. | RS. | RS. |
| Protective irrigation works (account head 35) .. | 1 | 2,49,509 | 55,964 | 8,742 | .. | 3,14,215 | 2,433 | 3,16,648 | 15,95,770 |
| Irrigation works not charged against revenue (account head 49) .. | 9 | 10,85,543 | 2,39,080 | 69,381 | — 70 | 13,93,924 | 66,106 | 14,60,040 | 5,46,14,918 |
| *Minor works and navigation.* | | | | | | | | | |
| Works for which capital and revenue accounts are kept (account head 43) .. | 7 | 2,32,839 | 51,497 | 4,758 | .. | 2,89,094 | 15,519 | 3,04,613 | *1,24,66,278 |
| Total .. | 17 | 15,67,891 | 3,46,541 | 82,881 | — 70 | 19,97,243 | 84,058 | 20,81,301 | 6,86,76,966 |

* Includes the capital outlay on the Ganjam-Gopálpur and Chilka lake canals from 1884-85 and 1885-86, respectively. The previous outlay on these works has not been traced yet.

2. On three of the major works, viz., the Kurnool canal, the Cauvery delta system and the Srívaikuntham anicut system, and on three of the minor works, viz., the Chembrambakam tank, the Madras water-supply project, and the Vedarniem canal, there was no capital outlay, and, on the remaining works, with the exception of the Rushikulya project, the Kistna delta system, the Periyár project and the Buckingham canal, the outlay was small, all having been practically completed. The sanction to the Godávari completion estimates expired at the end of 1889-90 and was not renewed.

3. The capital outlay on the Rushikulya project during the year amounted to Rs. 3,16,648. Good progress was made with the Russellkonda reservoir, the masonry works and the main canal. Some of the works were damaged by floods of exceptional severity.

The capital outlay on the Kistna delta system amounted to Rs. 5,[illegible]4,898, the principal work being in connection with the remodelling of the canals.

On the Periyár project the capital outlay was Rs. 7,62,465. The superstructure of the main dam was begun, progress was made with the escape on the right bank, and the cutting of the tunnel was commenced. The main and branch channels in the "plains" division of the project were also proceeded with.

The capital outlay on the Buckingham canal amounted to Rs. 2,06,037.

4. The following table exhibits the revenue receipts and working expenses of the works for which capital and revenue accounts are kept.

| System. | Capital outlay. | Gross revenue received in 1889-90. | | | Working expenses. | | | Net actual revenue. | *Deduct* receipts and charges on account of old irrigation. | Net revenue attributable to outlay of Government capital. | Percentage of return. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Irrigation revenue. | Miscellaneous receipts. | Total. | Direct. | Indirect. | Total. | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | RS. | RS. | RS. | RS. | RS. | RS. | RS. | RS. | RS. | RS. | RS. |
| *Major works.* | | | | | | | | | | | |
| Godávari .. .. .. .. .. | 1,27,19,245 | 22,33,175 | 1,14,912 | 23,48,087 | 5,80,819 | 33,574 | 6,14,393 | 17,33,694 | 1,15,500 | 16,18,194 | 12·72 |
| Kistna .. .. .. .. .. | 94,96,842 | 16,56,451 | 44,931 | 17,01,382 | 4,48,964 | 20,013 | 4,68,977 | 12,32,405 | 66,100 | 11,66,305 | 12·28 |
| Pennér .. .. .. .. .. | 18,66,941 | 2,63,881 | 498 | 2,64,379 | 47,643 | 2,740 | 50,383 | 2,13,996 | 87,000 | 1,26,996 | 6·80 |
| Sangam .. .. .. .. .. | 36,20,906 | 2,56,321 | 914 | 2,57,235 | 77,625 | 3,571 | 81,196 | 1,76,039 | 1,05,500 | 70,539 | 1·95 |
| Kurnool .. .. .. .. .. | 2,16,41,679 | 67,114 | 11,845 | 78,959 | 1,22,922 | 4,863 | 1,27,785 | — 48,826 | .. | — 48,826 | .. |
| Bárúr .. .. .. .. .. | 3,98,555 | 4,562 | 101 | 4,663 | 3,278 | 128 | 3,406 | 1,257 | 1,850 | — 593 | .. |
| Cauvery .. .. .. .. .. | 17,79,453 | 31,79,366 | 7,217 | 31,86,583 | 3,66,283 | 29,327 | 3,95,610 | 27,90,973 | 20,68,300 | 7,22,673 | 40·61 |
| Srívaikuntham .. .. .. .. | 14,51,541 | 1,82,410 | 1,152 | 1,83,562 | 35,216 | 2,033 | 37,249 | 1,46,313 | 66,500 | 79,813 | 5·50 |
| Total for 1889-90 .. | 5,29,75,162 | 78,43,280 | 1,81,570 | 80,24,850 | 16,82,750 | 96,249 | 17,78,999 | 62,45,851 | 25,10,750 | 37,35,101 | 7·05 |
| Total for 1888-89 .. | 5,22,77,587 | 77,94,787 | 1,68,286 | 79,63,073 | 17,27,287 | 69,486 | 17,96,773 | 61,66,300 | 24,94,810 | 36,71,490 | 7·02 |
| *Minor works.* | | | | | | | | | | | |
| Chembrambakam .. .. .. .. | 7,36,589 | 38,176 | 28 | 38,204 | 24,539 | 613 | 25,152 | 13,052 | 9,100 | 3,952 | 0·54 |
| Pálár .. .. .. .. .. | 18,85,632 | 2,52,884 | 979 | 2,53,863 | 1,08,878 | 2,694 | 1,11,572 | 1,42,291 | 1,21,100 | 21,191 | 1·12 |
| Pelandorai .. .. .. .. .. | 4,45,303 | 17,273 | .. | 17,273 | 18,550 | 467 | 19,017 | — 1,744 | 2,850 | — 4,594 | .. |
| Madras water-supply .. .. .. .. | 17,54,045 | 22,969 | 11,738 | 34,707 | 10,109 | 381 | 10,490 | 24,217 | 6,200 | 18,017 | 1·03 |
| Buckingham .. .. .. .. .. | 74,71,452 | .. | 75,747 | 75,747 | 1,47,237 | 4,683 | 1,51,920 | — 76,173 | .. | — 76,173 | .. |
| Chilka lake .. .. .. .. .. | 28,456 | .. | .. | .. | 1,812 | 47 | 1,859 | — 1,859 | .. | — 1,859 | .. |
| Vedarniem canal .. .. .. .. | .. | .. | 648 | 648 | 6,556 | 179 | 6,735 | — 6,087 | .. | — 6,087 | .. |
| Total for 1889-90 .. | 1,23,21,477 | 3,31,302 | 89,140 | 4,20,442 | 3,17,681 | 9,064 | 3,26,745 | 93,697 | 1,39,250 | — 45,553 | .. |
| Total for 1888-89 .. | * 1,20,55,131 | 3,55,557 | 85,727 | 4,41,284 | 2,33,444 | 6,362 | † 2,39,806 | 2,01,478 | 1,39,805 | † 61,673 | 0·51 |

* Exclusive of Rs. 27,590 expended on the Chilka lake canal, the capital account of which was not made up in 1888-89. | † Excluding the Chilka lake and Vedarniem canal.

5. The net revenue on account of major works was nearly a lakh more than during the previous year, but the minor works show a falling off in gross receipts and a considerable increase in working expenses, the result being that, after allowing for the old revenue receipts and charges, the minor works show in the aggregate a deficit of Rs. 45,553. This unfavorable result may be attributed partly to the character of the season, the rainfall having been scanty and the season a bad one for irrigation operations; but the principal portion of the deficit is attributable to the large excess of expenditure over receipts on the Buckingham canal. This, as well as the Chilka lake and Vedarniem canals, are purely navigation systems.

6. The deductions on account of old revenue receipts and charges have now been crystallised in the manner suggested in para. 4 of the review for 1888-89. The figures under this head for the Sangam and Bárúr systems must, however, still be regarded as only approximate.

The working expenses on the Kurnool canal are considerably less than during the previous year and steps have been taken by abolishing the telegraph line, &c., to curtail all unnecessary outlay; but there is still a deficit on the working of this canal.

The receipts on account of the Madras water-supply project include Rs. 11,463 on account of water supplied to the Municipality of Madras. The rate charged the Municipality is one rupee for every 1,000 cubic yards, or about 169,000 gallons. Such a rate is little more than nominal, and, while the Government of India has no wish to interfere with the arrangements as regards water-supply come to between the Government of Madras and the Municipality, it is desirable that the benefit derived by the latter under the existing system should be clearly stated.

7. The irrigation revenue shown in column 3 of the last statement is all realised in the Revenue Department, the charge for water, even when separately calculated, being consolidated and collected with the land revenue. The aggregate collections, amounting to Rs. 81,74,582, were made up as follows:—

| | RS. |
|---|---|
| Share of land revenue due to irrigation ... ... ... ... ... | 75,95,549 |
| Do. of enhanced land revenue .. ... ... ... ... | 5,04,959 |
| Adjustment due to revision of the accounts of the Cauvery delta. | 74,074 |
| Total ... | 81,74,582 |

The miscellaneous receipts shown in column 4 are those realised in the Public Works Department. The direct working expenses include a charge of 5 per cent. on the revenue receipts for the cost of collection charges in the Revenue Department.

8. In the following statement the true irrigation receipts are compared with the area charged as irrigated as shown in the detailed canal reports. Owing to the consolidation of the irrigation revenue with the land revenue, the revenue assessed is assumed as fully collected, except in the case of the Kurnool canal. For this canal the irrigation assessments were Rs. 75,801 and the collections Rs. 67,114—a difference of Rs. 8,687. The demands excluding cash refunds exceeded the realisations by Rs. 1,32,002, remissions to this amount being rendered necessary by deficiency or excess of water and other causes:—

| — | REVENUE DERIVED FROM IRRIGATED LANDS. | | AREA IRRIGATED. | | RATE PER ACRE. | |
|---|---|---|---|---|---|---|
| | 1889-90. | 1888-89. | 1889-90. | 1888-89. | 1889-90. | 1888-89. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| *Major works.* | RS. | RS. | ACS. | ACS. | RS. | RS. |
| Godávari .. .. .. .. | 22,33,175 | 21,68,816 | 672,239 | 651,619 | 3·3 | 3·3 |
| Kistna .. .. .. .. | 16,56,451 | 15,70,020 | 433,975 | 416,205 | 3·8 | 3·7 |
| Pennér .. .. .. .. | 2,63,881 | 2,29,387 | 66,171 | 59,653 | 3·9 | 3·8 |
| Sangam .. .. .. .. | 2,56,321 | 2,20,011 | 64,926 | 55,938 | 3·9 | 3·9 |
| Kurnool .. .. .. .. | 67,114 | 76,377 | 21,851 | 34,999 | 3·1 | 2·2 |
| Bárúr .. .. .. .. | 4,562 | 3,565 | 1,712 | 1,344 | 2·7 | 2·6 |

| — | Revenue derived from irrigated lands. | | Area irrigated. | | Rate per acre. | |
|---|---|---|---|---|---|---|
| | 1889-90. | 1888-89. | 1889-90. | 1888-89. | 1889-90. | 1888-89. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | RS. | RS. | ACS. | ACS. | RS. | RS. |
| *Major works—cont.* | | | | | | |
| Cauvery .. .. .. .. | 31,79,366 | 33,42,120 | 1,010,698 | 1,007,136 | 3·1 | 3·3 |
| Srívaikuntham .. .. .. | 1,82,410 | 1,84,491 | 39,785 | 40,420 | 4·6 | 4·5 |
| Total irrigation works not charged against revenue .. | 78,43,280 | 77,94,787 | 2,311,357 | 2,267,314 | 3·4 | 3·4 |
| *Minor works.* | | | | | | |
| Chembrambakam .. .. .. | 38,176 | 57,398 | 14,469 | 19,416 | 2·6 | 2·9 |
| Páiár .. .. .. .. | 2,52,884 | 2,63,778 | 93,848 | 97,023 | 2·7 | 2·7 |
| Pelandorai .. .. .. .. | 17,273 | 12,186 | 5,994 | 4,529 | 2·9 | 2·6 |
| Madras water-supply .. .. .. | 22,969 | 22,195 | 10,689 | 10,251 | 2·1 | 2·1 |
| Total minor works .. | 3,31,302 | 3,55,557 | 125,000 | 131,219 | 2·6 | 2·7 |
| Grand Total .. | 81,74,582 | 81,50,344 | 2,436,357 | 2,398,533 | 3·4 | 3·4 |

9. In column 4 of the preceding statement the area given is that cultivated under both first and second crops. In the following statement the area under each crop and the corresponding revenue are given for the principal major systems, the figures being taken from the individual canal reports. The revenue figures in this case only give the irrigation revenue proper, omitting the share of the enhanced land revenue :—

| System. | Area ultimately irrigable. | Area irrigated, 1889-90. | | Revenue derived. | | Rate per acre. | |
|---|---|---|---|---|---|---|---|
| | | First crop. | Second crop. | First crop. | Second crop. | First crop. | Second crop. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | ACS. | ACS. | ACS. | RS. | RS. | RS. | RS. |
| Godávari .. .. | 612,000 | 618,649 | 53,590 | 19,49,377 | 1,28,178 | 3·15 | 2·39 |
| Kistna .. .. | 475,000 | 433,922 | 53 | 14,90,428 | 160 | 3·43 | 3·02 |
| Pennér .. .. | 69,385 | 63,858 | 2,313 | 2,40,102 | 6,630 | 3·76 | 2·87 |
| Sangam .. .. | 94,000 | 60,638 | 4,288 | 2,36,818 | 12,573 | 3·90 | 2·93 |
| Cauvery .. .. | 919,539 | 908,385 | 102,313 | 27,31,275 | 2,32,788 | 3·00 | 2·27 |
| Srívaikuntham .. .. | 30,393 | 21,815 | 17,970 | 1,24,365 | 56,207 | 5·70 | 3·13 |

The area irrigated under first crop in the Godávari delta exceeded the estimated ultimate area of irrigation. The high average assessment for first-crop irrigation under the Srívaikuntham anicut is again remarkable and the attention of the Madras Government is invited to the comments that were made thereon in para. 8 of the review on the report for 1888-89.

10. The following statement exhibits the actual working expenses of each of the major systems and of the minor systems in the aggregate, without deducting the old maintenance charges :—

| Systems. | 1889-90. | | | | | 1888-89. |
|---|---|---|---|---|---|---|
| | New works and repairs. | Establishment. | Tools and plant. | Indirect charges. | Total. | Total. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | RS. | RS. | RS. | RS. | RS. | RS. |
| *Major works.* | | | | | | |
| Godávari .. .. .. .. | 2,34,853 | 3,03,770 | 42,196 | 33,574 | 6,14,393 | 6,68,013 |
| Kistna .. .. .. .. | 1,99,666 | 2,48,947 | 30,351 | 20,013 | 4,68,977 | 4,21,752 |
| Pennér .. .. .. .. | 20,728 | 26,915 | .. | 2,740 | 50,383 | 48,612 |
| Sangam .. .. .. .. | 45,432 | 31,820 | 373 | 3,571 | 81,196 | 72,410 |
| Kurnool canal .. .. .. | 88,985 | 28,780 | 5,157 | 4,863 | 1,27,785 | 1,51,097 |
| Barór .. .. .. .. | 2,330 | 948 | .. | 128 | 3,406 | 1,456 |
| Cauvery .. .. .. .. | 1,16,227 | 2,49,843 | 213 | 29,327 | 3,95,610 | 3,96,461 |
| Srívaikuntham .. .. .. | 15,526 | 19,690 | .. | 2,033 | 37,249 | 36,972 |
| Total major works .. | 7,23,747 | 8,80,713 | 78,290 | 96,249 | 17,78,999 | 17,96,773 |
| Minor works and navigation .. .. | 2,41,550 | 73,578 | 2,553 | 9,064 | 3,26,745 | 2,39,806 |
| Grand Total .. | 9,65,297 | 9,54,291 | 80,843 | 1,05,313 | 21,05,744 | 20,36,579 |
| Per acre irrigated by major works .. | .. | .. | .. | .. | 0·77 | 0·79 |

11. The charge for establishment in column 3 of the last statement is made up as follows:—

| — | | Major works. | Minor works and navigation. | Total. |
|---|---|---|---|---|
| | | RS. | RS. | RS. |
| Revenue management | Direction and executive .. .. .. | 4,58,779 | 9,221 | 4,68,000 |
| | Collection charges .. .. .. | 2,47,764 | 8,815 | 2,56,579 |
| | Total .. | 7,06,543 | 18,036 | 7,24,579 |
| Maintenance of works .. .. .. .. .. | | 1,74,170 | 55,542 | 2,29,712 |
| | Grand total .. | 8,80,713 | 73,578 | 9,54,291 |

12. The principal crop irrigated was rice, the irrigated area under which was 2,189,489 acres of the estimated value of 540 lakhs of rupees.

13. The miscellaneous receipts in column 4 of the statement in para. 4 are made up of the following items:—

| | RS. |
|---|---|
| Plantations ... ... ... ... ... ... ... ... | 11,248 |
| Navigation ... ... ... ... ... ... .. ... | 2,01,176 |
| Sundry ... ... ... ... ... ... ... ... | 61,945 |
| Less cash refunds of revenue ... ... ... ... ... | —3,659 |
| Total ... | 2,70,710 |

14. The navigation receipts were divided as follows among the different canals, excluding the Vedarniem canal, on which they were only Rs. 647:—

| Canals. | Length of navigable channels. | Receipts. | Expenditure. | Value of goods. | Ton mileage. |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| | MILES. | RS. | RS. | RS. | |
| Godávari .. .. .. .. | 496 | 94,253 | 67,036 | 2,77,78,097 | 10,741,945 |
| Kistna .. .. .. .. | 281 | 28,732 | 61,485 | 1,83,75,765 | 10,740,830 |
| Kurnool .. .. .. .. | 190 | 1,360 | 14,794 | 5,65,909 | .. |
| Buckingham .. .. .. .. | 262 | 73,123 | 1,51,920 | 1,74,03,566 | 14,553,846 |
| Total .. | 1,229 | 1,97,468 | 2,95,235 | 6,41,23,337 | 36,036,621 |
| Corresponding figures of previous year .. | 1,214 | 1,96,977 | 2,56,709 | 4,86,88,041 | 35,218,322 |

The excess of expenditure over receipts in the case of the Buckingham canal is again very noticeable, as is also the fact that, with the exception of the Godávari system, none of the canals show a profit. The attention of the Madras Government is invited to the remarks in para. 9 of the review on the report for 1888-89 regarding the propriety of raising the license fees. The loss on navigation operations is Rs. 97,766 against Rs. 59,732 in 1888-89.

15. Besides the major and minor works referred to in the preceding paragraphs the report also deals with irrigation works for which neither capital nor revenue accounts are kept and with agricultural works. The former class of works consist chiefly of tanks and river channels and the importance of them to Madras irrigation may be gauged from the following figures:—

| Year. | Area, first and second crop. | Irrigation revenue. | Rate per acre. | Working expenses (direct charges in the Public Works Department only). | Rate per acre. |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| | ACS. | RS. | RS. | RS. | RS. |
| 1889-90 .. .. .. | 3,524,360 | 90,62,740 | 2·57 | 15,98,599 | ·52 |

The information regarding these works furnished in the report is, however, incomplete. In table II, on pages 6 and 7, only the direct charges in the Public Works Department on account of them is given, the columns showing indirect charges and collection charges in the Revenue Department not having been filled in. On page 54 the old maintenance charges on account of these works are given as Rs. 3,63,744, but the old revenue receipts are not separately stated. The attention of the Madras Government is invited to the necessity of furnishing complete information regarding these works in future reports. The figures given above include the old revenue receipts; the working expenses also include the old maintenance charges, but the charges on account of the tank restoration scheme have been deducted.

The area irrigated was made up of 2,68,799 acres of first and 825,561 acres of second crop.

16. Works included in this category are divided in the report into "Imperial" and "Minor," the former comprising the more important tanks and channels which are under the charge of the officers of the Public Works Department, the latter comprising all the small works which are under the charge of the Revenue officers. The use of the term "Imperial" in connection with the former class of works is somewhat misleading, as the works are not "Imperial" in the sense of funds for their maintenance being provided from Imperial resources. The charges on their account are wholly Provincial and the Madras Government is invited to consider whether it would not be possible to adopt for them some less ambiguous nomenclature.

17. In addition to the ordinary outlay incurred on these works, for which neither capital nor revenue accounts are kept, there was special expenditure on account of the tank restoration scheme, the origin and scope of which were described in paras. 14—17 of last year's review. Eight investigating parties were at work during the year and executive work in connection with the scheme was carried out in nine districts. The following statement shows the expenditure incurred:—

| — | Expenditure during 1889-90. | | | | | Expenditure to end of 1889-90. |
|---|---|---|---|---|---|---|
| | Works. | Repairs. | Establishment. | Tools and plant. | Total. | |
| | RS. | RS. | RS. | RS. | RS. | RS. |
| Execution .. .. .. | 1,52,435 | 2,52,368 | 92,865 | 6,056 | 5,03,724 | 16,89,330 |
| Investigation .. .. .. | 27,705 | .. | 74,950 | 886 | 1,03,541 | 8,89,945 |
| Total .. | 1,80,140 | 2,52,368 | 1,67,815 | 6,942 | 6,07,265 | 25,79,275 |

The number of works investigated, for which estimates had been sanctioned at the close of the year was 1,974, the estimates aggregating Rs. 21,21,811. At the same time estimates, aggregating Rs. 4,32,064 for 314 works, were under disposal, so the result of the investigation up to the close of the year is, therefore, that estimates for 2,288 works to the amount of Rs. 25,53,875 have been prepared at a cost of Rs. 8,89,945, or nearly 35 per cent. It is probably impossible to state at present what the result on the irrigation revenue of the outlay on this class of works is likely to be, but, in view of the large expenditure that is being incurred, this is a subject to which the continued attention of the Government of Madras is particularly invited. The question of the advisability of continuing the tank restoration scheme on the present scale was referred to in para. 17 of last year's review and also in a letter to the Government of Madras No. 143 I., dated 9th August 1890, to which a reply is still awaited.

18. The last class of works dealt with in the report are agricultural works which comprise river embankments and conservancy. The outlay on these was as follows:—

| | RS | RS. |
|---|---|---|
| Original works ... ... ... ... ... ... | 1,49,004 | |
| Repairs ... ... ... ... ... ... ... | 2,09,389 | |
| | | 3,58,393 |
| Establishment ... ... ... ... ... ... | ... | 80,869 |
| Tools and plant ... ... ... ... ... ... | ... | 5,160 |
| | | 4,44,422 |

19. The report was received by the Government of India on 1st December. The modifications in statement No. II in the body of the report comparing the receipts and charges, which were suggested by the Government of India in letter No. 78 I. of 8th May 1890, have been carried into effect and are conducive to clearness A fixed sum has also now been taken for the receipts and charges on account of old irrigation under each system. The remarks made in para. 19 of the review of the report for 1888-89, regarding the absence of information of professional interest, have not, however, received attention, and the notice of the Government of Madras is again invited to this matter, to which the Government of India attaches considerable importance.

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*Order*—Ordered that copies of this review and of the report be forwarded to the Finance and Commerce and Revenue and Agricultural Departments for information.

Ordered, also, that copies of this review be forwarded to the Government of Madras for information and guidance and that copies of the review be forwarded to the Local Governments and Administrations in the Public Works Department noted in the margin for information.

The Governments of Bombay, Bengal, the North-Western Provinces and Oudh, and the Punjab.
The Chief Commissioner of the Central Provinces.
The Agent to the Governor-General for Rajputana.

Ordered, further, that this review be published in the supplement to the *Gazette of India* and that copies of this review and of the report be forwarded to Her Majesty's Secretary of State for India.

(Signed) C. VINCENT,
Under-Secy. to the Govt. of India.

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ORDER—dated 17th March 1891, No. 261 I., Public Works.

The question of the advisability of enhancement of irrigation rates in the northern districts has already been dealt with in G.O., No. 50 (Revenue), dated 26th January 1891, communicated to the Government of India with letter No. 51 of the same date.

2. The propriety of raising the license fees and tolls on the navigable canals referred to in para. 14 is under consideration.

3. The information required according to para. 15 will be given in future administration reports.

4. The question of a change of nomenclature for the class of irrigation works now called "Imperial," though their maintenance is provided from "Provincial" resources, will be considered as requested in para. 16.

5. The Chief Engineer for Irrigation will pay attention to the wishes of the Government of India, communicated in para. 19, as regards the furnishing, with future administration reports, information of professional interest.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
To Superintending Engineers.
To the Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 17th.*

*Recd.* *Encl.*

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**G.O., 17th Mar. 1891, No. 261 I.**

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**MARCH.**

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**Irrigation works in the Madras Presidency**

Passing orders on the review by the Government of India of the Administration Report of — for 1889-90..

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

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### Irrigation.

READ—the following paper :—

*Notes of inspection of Periyár Project works, February and March* 1891.

*No. I division—Main dam.*—Good progress has been made since the last inspection ; the filling of the spaces between the double walls in front and rear of the dam has been completed and the operation appears to be perfectly successful as regards the stopping of leakage.

2. The filling of the central portion with concrete has made fair progress and it is hoped that this space will be filled up to zero of the Periyár surveys before the end of this season.

3. The front wall is being raised and it is intended to raise this to 30·00 from the left bank to the cross wall, which bounds the main byewash, and to 25·00 from this point to the line of the turbine channel weir (about 80 feet) ; beyond this there will be one vent with its sill at 17, another at 20, and others on higher levels. It is believed that no water will pass over the 25·00 portion until the discharge reaches about 1,400 cubic feet a second, and that the main wall will not be topped by a discharge less than 7,000 cubic feet per second, so that next season's work will not be subject to much interruption.

4. Water will be passed to the turbine channel and the main workshops almost immediately by the closing of the lower vents in the front wall, and although it is not likely that any appreciable amount of work will be done by the machinery this season, the latter should be tested in order that all defects may be set right at once. The water should be allowed to flow freely through the scouring sluice in the turbine weir for at least a week before being allowed to pass into the turbine itself, in order that all dirt and rubbish may be removed from the channel.

5. The Superintendent of Works should submit, as soon as possible, after the close of the season's work, a report of the operations on the main dam on the same general lines as that printed with G.O., No. 333 I. of 16th June 1890 ; the report should be accompanied by a survey plan similar to that accompanying the former report, but brought up to date, and by such other plans and sections as may be necessary.

6. A plan of the main dam should also be submitted, showing the exact level at which each portion of the work has been left ; a sketch showing what is wanted will be separately forwarded.

7. *Tunnel.*—The new shaft has made good progress and ought to be nearly, if not quite, completed before the end of this season. A small winding engine, which will probably cost about £ 120, will be required for this shaft and arrangements should be made for its purchase.

8. The undersigned has been in communication with the Consulting Engineer to the India Office on the subject of the turbine which drives the main compressors at the northern end of the tunnel and which has been found to be of insufficient power for its purpose. Tenders have been obtained by the Consulting Engineer for a new turbine, but action on the matter has been postponed until it could be seen whether the defects of the existing turbine could be corrected. This has been done, though only partially, but, after discussion with the Superintendent of Works, the undersigned considers that it would be better to supplement the turbine by a small compressor worked by steam, which would not only give additional power at

all times but allow work to continue when the supply of water runs short as it has done during this season at a much earlier period than was anticipated. With this view it is proposed to purchase the remainder of the plant offered by the Ceylon Government, the cost of which is only Rs. 7,500, which will probably be nearly covered by saving on labor and establishment owing to increased speed of working.

9. *No. II lock.*—The new weir is nearly completed and a very good job has been made of it.

10. The other works call for no special remark. The health of the coolies is not so good as it was and it seems probable that work will have to be stopped about the end of March; the Superintendent of Works must use his own discretion on this point.

11. In a separate note application has been made for the purchase of a second steamer for use on the lake and Muliya Panjan canal, and the Superintendent of Works has submitted an estimate for Rs. 1,200 for lighting the main workshed by electricity to enable work to be done at night. This latter is based upon an estimate supplied by a Madras firm in whose qualifications the undersigned has not much confidence and is probably insufficient.

12. The undersigned does not approve of night work except on rare emergencies, and it is doubtful whether it would be worth while to incur the expense of plant which might only be used two or three times a year.

13. The undersigned is about to proceed to England on privilege leave and would propose, with the approval of Government, that he should arrange with the India Office for the purchase of the small steamer and winding engine referred to in these notes and should make inquiries regarding the plant for electric lighting, using his own discretion as to its purchase.

14. *No. II division.*—The only works calling for special notice are the following:—

*First reach main channel.*—The earthwork is still backward, the contractor having apparently done next to nothing during the last three months; his time has been twice extended and no further extension beyond the 31st March (the present date of termination of the contract) should be allowed. He should be given clearly to understand that neither he nor his agents will be allowed to do any work after that date. The security held on his account is probably quite sufficient to cover any loss due to the substitution of fresh agency and to the completion of any work left unfinished by him. He has been treated with great consideration and has no possible ground of complaint.

15. The construction of the Ramrajpuram surplus sluice has been delayed pending consideration of certain proposals made by the Superintending Engineer for the modification of the design; orders have been given on those proposals and the work should be pushed on. Every effort should be made to complete the works in this reach, so that the establishment may be transferred to the lower reaches.

16. *Fifth reach.*—The Shattryar crossing is making good progress; the Marangaliar crossing has been delayed for want of pumping power, the negotiation with the Madura Municipality for the purchase of an engine and pump having fallen through; orders have now been given for the purchase of a large pulsometer and there should be no difficulty in getting in the foundations during the coming hot weather.

17. Work has been much interfered with by the unusual rain in January and February, but on the whole the progress is fair.

18. Revised plans are required for nearly the whole of the remaining works in the seven lower reaches, and these, especially for the cross drainage works, should be submitted as soon as possible.

19. The sanctioned estimates provide for a large number of inlets and outlets, and it is probable that a considerable saving of money as well as increased efficiency will be obtained by the substitution of superpassages for these works.

20. These may be all on the same general principle as those for the Shattryar and Marangaliar crossings; there is ample fall available and there will probably be no difficulty in allowing an extra fall of one foot in the channel at each superpassage, in

which case the velocity may be taken at 6 feet per second and the following dimensions will be suitable :—

| — | Span. | Height to springing. | Rise. | Area of waterway. |
|---|---|---|---|---|
| | FEET. | FEET. | FEET. | SQ. FT. |
| 6th reach ... ... ... ... ... | 24 | 5 | 4 | 184 |
| 7th do. ... ... ... ... ... | 24 | 4½ | 4 | 172 |
| 8th do. ... ... ... ... ... | 24 | 4½ | 4 | 172 |
| 9th do. ... ... ... ... ... | 20 | 5½ | 4 | 163 |
| 10th do. ... ... ... ... ... | 16 | 5 | 3 | 112 |
| 11th do. ... ... ... ... ... | 12 | 4½ | 3 | 70 |
| 12th do. ... ... ... ... ... | 8 | 5 | 2 | 51 |

21. It is quite useless to attempt to calculate the discharge of the nullas from sections of their beds and a maximum of 600 $M^{\frac{2}{3}}$ should be provided for; the fall in all cases is so great that a velocity of 12 feet per second may be allowed, making the area of the waterway between parapets of the superpassage 50 $M^{\frac{2}{3}}$; the depth will usually be about five feet.

22. The designs should be prepared in accordance with these principles.

(Signed) J. PENNYCUICK, Colonel, R.E.,
Chief Engineer, P.W.D.

14th March 1891.

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Order—dated 17th March 1891, No. 262 I., Public Works.

Communicated to the Superintendent of Works, No. I Periyár division, and the Superintending Engineer, VI Circle, who will attend to the remarks of the Chief Engineer.

2. The purchase of the remainder of the tunnelling plant offered by the Ceylon Government at a cost of Rs. 7,500 is sanctioned, and the Secretary of State will be informed, with reference to G.O., No. 368 I. of 3rd July 1890, that the more powerful turbines therein mentioned will not be required.

3. The Chief Engineer is authorised, in communication with the India Office, to arrange for the purchase of the steamer, hoisting engine and electric lighting plant referred to in his note, provided the cost does not materially exceed the following sums :—

| | £ |
|---|---|
| Steamer ... ... ... ... ... ... ... ... ... | 600 |
| Hoisting engine ... ... ... ... ... ... ... ... | 120 |
| Electric lighting plant ... ... ... ... ... ... ... | 200 |

(Here enter No. 263 I., dated 17th March 1891.)

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Chief Engineer, Public Works Department.
" " " for Irrigation.
" Superintending Engineer, VI Circle.
" Superintendent of Works, No. I Periyár division.
" Examiner, Public Works Accounts.

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Endorsement—dated 17th March 1891, No. 263 I., Public Works.

Copy of the above forwarded to the Government of India.

(By Order.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 17th.*

*Recd.* *Encl.*

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**G.O., 17th Mar. 1891, Nos. 262 I, 263 I.**

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**MARCH.**

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**Periyar Project Works**

Forwarding copy of orders on the notes of inspection of the — by the Chief Engineer, Public Works Department.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

Read—the following papers :—

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 27th January 1891, Mis. No. 405 A.

Mr. Clogstoun.

*Resolution*—dated 27th January 1891, Mis. No. 405 A.

Owing to the failure of the season in parts of the Nellore district, it is probable that distress will be felt in the portion of the Venkatagiri zemindari, which lies around that town, and in the portions of the Pólúr division lying to the east, and it is desirable that some public work, capable of giving employment to a considerable number, should be started in the south of the district in view to gauging the demand for employment. The Executive Engineer in charge of the Buckingham canal is requested to report whether suitable work can be found in connection with the Buckingham canal, and, if so, at what localities and how many coolies can be employed and for what period.

(A true Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 5th February 1891, Mis. No. 528.

Mr. Clogstoun.

*Read*—the following letter from Major O. V. BODDY, R.E., Executive Engineer, Buckingham canal, dated 28th January 1891, No. 1495 :—

With reference to the Proceedings of Board of Revenue, Mis. No. 405 A., dated 27th January 1891, I have the honor to inform you that a diversion to the canal from Chintamani backwater (21st mile) to Pulicat is available as a relief work and that 600 laborers could be employed on it for a period of six months.

There is also a diversion to the canal from the 50th mile to the 58th mile which can be made shortly available as a relief work and on which about 2,500 laborers might be employed for the period of one year. There is also a diversion south of Madras from the 18th mile to the 30th mile, on which about 1,800 laborers could be employed for one year.

*Resolution*—dated 5th February 1891, Mis. No. 528.

The Board is much obliged to Major Boddy for the information furnished in the above letter. He is requested to state whether the works referred to are sanctioned works and whether any provision has been made in the budget of the current or next year.

(A true Copy and Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 4th March 1891, Mis. No. 1037.

MR. CLOGSTOUN.

*Read*—the following letter from Major O. V. BODDY, R.E., Executive Engineer, Buckingham canal, dated 10th February 1891, No. 1568 :—

With reference to Board's Proceedings, Mis. No. 528, dated 5th February 1891, I have the honor to inform you that, of the works alluded to, the Pulicat diversion and the diversion from the 50th to 58th mile are approved works, but the estimates not having yet been submitted, they are not sanctioned. There *is* an allotment of Rs. 2,000 for the Pulicat diversion and there was an allotment of Rs. 5,000 for the 50th to 58th mile diversion, which I surrendered, but which I have no doubt could immediately be again made available. The diversion from 18th to 30th mile is a sanctioned work, for which there is no allotment this year, but funds could probably be made available at once if it be considered desirable to proceed with it as a relief work.

*Resolution*—dated 4th March 1891, Mis. No. 1037.

The Collectors of Nellore and Chingleput are requested to report at once whether they consider that any of the works referred to in the Executive Engineer's letter should be started at an early date to give employment to the people in the affected villages in their districts.

(A true Copy and Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 12th March 1891, No. 137.

MR. CLOGSTOUN.

*Read*—the following letter from J. H. A. TREMENHEERE, Esq., Acting Collector of the Chingleput district, dated 6th March 1891, Reference No. 121 G. and B.-S.L.R.

In reply to Board's Proceedings, Mis. No. 1037, dated 4th instant, I have the honor to state that both the marginally-noted works, which alone are within the limits of this district, will very well serve as relief works as they will afford employment to many of the affected villages of Ponnéri and Chingleput taluks.

(1) Diversion of canal from Chintamani back-water to Pulicat.
(2) Diversion of canal from 18th to 30th mile, south of Madras.

2. I have already asked the Executive Engineer, Buckingham canal, to commence the first work and request that the Board will be pleased to arrange for the second being started immediately as there is no other large work at present in progress in those parts of the Chingleput taluk. The date of starting should be communicated to me and also (to save time) to the Tahsildars concerned.

*Resolution*—dated 12th March 1891, No. 137.

Submitted to Government with the Board's request that very early orders may be issued in the Public Works Department to commence the two works referred to by Mr. Tremenheere.

(A true Copy and Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

No. 1732, Revenue.

Transferred to the Department of Public Works for very early orders.

FORT ST. GEORGE,
13th March 1891.

(Signed) C. A. GALTON,
Secretary to Government.

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No. 54 I.

*Note by the Chief Engineer for Irrigation.*

With reference to the endorsement No. 1732, dated 13th instant, of the Revenue Secretary on Resolution No. 137, dated 12th March 1891, of the Board of Revenue—

(1) The work of diversion of the Buckingham canal from the Chintamani backwater to the Pulicat lake has already been ordered "to be got ready to proceed with without any delay," and the following telegram has now been sent to the Superintending Engineer, II Circle, viz. :—

Memos. 2, 6th January, 11, 4th instant. Immediate submission of estimate and commencement of work "departmentally" necessary.

And a copy of this has been sent direct to the Executive Engineer, Buckingham canal, "for information and guidance."

(2) As regards the diversion of the canal "from 18 to 30 miles *south of Madras*," the work was sanctioned in G.O., No. 169 I., dated 25th March 1889, but has not yet been put in hand for the reasons stated in notes of inspection with Proceedings of the Madras Government No. 167 I., dated 25th March 1889, and, as the position does not appear very suitable for the present relief requirements, I would not advocate its being gone on with, but that instead the diversion from 67 miles 2 furlongs to 69 miles 3 furlongs north of Madras near Dugarázpatnam (Rs. 21,500), sanctioned in G.O., No. 206 I., dated 4th March 1891, be ordered to be put in hand at once "departmentally."

(3) To carry out such instructions, the Executive Engineer, Buckingham canal, would require an extra upper subordinate.

CHEPÂK,
14th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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ORDER—dated 17th March 1891, No. 267 I., Public Works.

The recommendations of the Chief Engineer for Irrigation are approved and an extra upper subordinate will be supplied to the Buckingham canal division.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer, Public Works Department.
" Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 17th.*

*Recd.* *Encl.*

**G.O., 17th Mar. 1891, No. 267 I.**

**MARCH.**

### Buckingham Canal

The recommendations of the Chief Engineer for Irrigation to carry out the diversion of the — in certain places as relief works approved and an upper subordinate ordered to be posted to the Buckingham canal division.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper :—

No. 53 I.

*Note by the Chief Engineer for Irrigation.*

The accompanying revised schedules of works which remained to be executed on the Godávari delta system chargeable to " 49. Major works (construction)" have been prepared in this office from the detailed statement of works to be carried out, received from the Superintending Engineer, I Circle, with his letter No. 2152 G.D., dated 13th February 1891, as the amounts therein shown to be required for several works vary from those provided for in the schedules printed in Proceedings of the Madras Government, No. 428 I., dated 11th August 1890, and sanctioned by the Government of India in its letter printed with G.O. No. 664 I., dated 17th November 1890. The revised schedules have been verified by the Examiner of Public Works Accounts and are submitted to Government for sanction. The excess on several works is for the most part covered by savings on other works. The net excess, Rs. 1,218, shown in the revised schedule I of the works for which detailed estimates had been sanctioned on the closure of the construction estimate on 31st March 1890 may, it is suggested, be met by reducing the amount of the estimate of Priestman's dredger, " A" size, and barge from Rs. 14,270 to Rs. 13,052.

CHEPÂK,
12th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ENCLOSURES.

REVISED SCHEDULE I of the works which remained to be executed on the Godávari Delta System chargeable to " 49. Major works (construction)" for which detailed estimates have been sanctioned by competent authority on the closure of the construction estimate on 31st March 1890.

| Consecutive number of items. | No. of items in the schedules printed in P.M.G. No. 428 I., dated 11th Aug. 1890. | Classification of main and sub-heads. | Names of works. | Amount provided in the sanctioned schedules. | Amount required. | Difference. Increase. | Difference. Decrease. | Probable date of completion. |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | | | | RS. | RS. | RS. | RS. | |
| | | | I. WORKS WHICH ARE NECESSARY FOR THE FULL DEVELOPMENT OF THE PROJECT, BUT WHICH ARE NOT IN THEMSELVES REMUNERATIVE. | | | | | |
| | | | *Central Section.* | | | | | |
| | | (2) Main canals and branches— | Bendamurlanka canal. | | | | | |
| 1 | 1 | K. Buildings. | Inspection shed .. .. .. | 972 | 972 | .. | .. | 31st Mar. 1891. |
| 2 | 2 | .. | Establishment .. .. .. | 224 | 224 | .. | .. | |
| | | | | 1,196 | 1,196 | .. | .. | |

Revised Schedule I of the wokrs which remained to be executed, &c.—*cont.*

| Consecutive number of items. | No. of items in the schedules printed in P.M.G. No. 428 I., dated 11th Aug. 1890. | Classification of main and sub-heads. | Names of works. | Amount provided in the sanctioned schedules. | Amount required. | DIFFERENCE. Increase. | DIFFERENCE. Decrease. | Probable date of completion. |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | | | II. WORKS WHICH ARE DIRECTLY REMUNERATIVE IN THEMSELVES. | RS. | RS. | RS. | RS. | |
| | | | *Central Section.* | | | | | |
| | | (2) Main canals and branches—*cont.* | Main canal. | | | | | |
| 2 | 3 | I. Navigation works. | Bobberlanka lock .. .. | 1,800 | 2,600 | 800 | .. | 31st Mar. 1891. |
| 3 | 4 | L. Earthwork. | Canal improvements .. .. | 350 | 348 | .. | 2 | Do. |
| 4 | .. | B. Land .. | Compensation for land .. .. | .. | 342 | 342 | .. | Do. |
| | | | Gunnaram canal. | | | | | |
| 5 | 5 | B. Land .. | Compensation for land .. .. | 258 | 258 | .. | .. | 31st Mar. 1891. |
| 6 | 6 | G. Bridges .. | Fender pile foot bridge at Ramachendrapur surplus weir. | 70 | 74 | 4 | .. | Completed. |
| | | (3) Distributaries— | | | | | | |
| 7 | 7 | C. Works .. | Mataparru channel head sluice .. | 129 | 54 | .. | 75 | Do. |
| 8 | 8 | Do. .. | Malikipuram do. do .. | 80 | 4 | .. | 76 | Do. |
| 9 | 9 | Do. .. | Sluice at 14 miles 70 chains for direct irrigation. | 150 | 150 | .. | .. | 31st Mar. 1891. |
| 10 | 10 | Do. .. | Sluice at 45 miles 4 chains .. | 195 | 98 | .. | 97 | Completed. |
| 11 | .. | Do. .. | More channel head sluice .. .. | .. | 18 | 18 | .. | Do. |
| 12 | .. | Do. .. | Velankayalakodu channel head sluice. | .. | 38 | 38 | .. | Do. |
| 13 | .. | Do. .. | Antervedi channel head sluice .. | .. | 62 | 62 | .. | Do. |
| 14 | .. | Do. .. | Kobberitota channel head sluice .. | .. | 56 | 56 | .. | Do. |
| 15 | 11 | B. Land .. | Parallel channel from Mamiditota to Kokkerayalakodu. | 105 | 105 | .. | .. | Do. |
| 16 | .. | Do. | Branch from Bolitippa channel to irrigate high lands of Tatipaka. | .. | 200 | 200 | .. | 31st Mar. 1891. |
| 17 | 12 | L. Earthwork. | Do. do. do. .. | 402 | 196 | .. | 206 | Do. |
| | | (2) Main canals and branches— | Bank canal. | | | | | |
| 18 | 13 | B. Land .. | Compensation for land .. .. | 300 | 300 | .. | .. | 31st Mar. 1891. |
| | | (3) Distributaries— | | | | | | |
| 19 | .. | B. Land .. | Vedapalem channel .. .. | .. | 2,300 | 2,300 | .. | Do. |
| 20 | 20 | Do. .. | Palankurru No. 2 channel .. .. | 118 | 118 | .. | .. | Do. |
| 21 | 14 | Do. .. | Nimmakayala Kottapalli channel head sluice. | 150 | — 1 | .. | 151 | Completed. |
| 22 | 15 | Do. .. | Dondikurru channel head sluice .. | 100 | 109 | 9 | .. | 31st Mar. 1891. |
| 23 | 16 | Do. .. | Kandikuppa do. do. .. | 100 | 121 | 21 | .. | Do. |
| 24 | 17 | Do. .. | Palankurru No. 2 channel head sluice. | 100 | 102 | 2 | .. | Do. |
| 25 | 18 | Do. .. | Vadapalem do. do. | 34 | 80 | 46 | .. | Do. |
| 26 | 19 | Do. .. | Geddanapalli do. do. | 100 | 93 | .. | 7 | Do. |
| 27 | .. | Do. .. | Amapuram and Kundaleswaram sluice. | .. | 206 | 206 | .. | Completed. |
| 28 | 21 | (3) L. Earthwork. | Vedapalem channel .. .. | 3,750 | 2,537 | .. | 1,213 | 31st Mar. 1891. |
| 29 | 22 | Do. .. | Dantikurru branch channel .. | 840 | 840 | .. | .. | Do. |
| 30 | .. | Do. .. | Anataram channel .. .. | .. | — 71 | .. | 71 | Completed. |
| | | | Amalapuram canal. | | | | | |
| 31 | 23 | (2) B. Land .. | Compensation for land .. .. | 54 | 54 | .. | .. | 31st Mar. 1891. |
| 32 | 24 | (3) C. Works .. | Vani-Chintalapudi channel sluice .. | 447 | 447 | .. | .. | Do. |
| 33 | 25 | Do. .. | Bandarulanka channel head sluice .. | 70 | 81 | 11 | .. | Do. |
| 34 | 26 | Do. .. | Kunavaram channel head sluice .. | 148 | 227 | 79 | .. | Do. |
| 35 | 27 | Do. .. | Saripalli channel sluice .. .. | 322 | 321 | .. | 1 | Do. |
| 36 | 28 | Do. .. | Vilsa channel and dam .. .. | 150 | 360 | 210 | .. | Completed. |
| 37 | 29 | Do. .. | Challapalli channel sluice .. .. | 96 | 130 | 34 | .. | 31st Mar. 1891. |
| 38 | 30 | Do. .. | Surasamyanam channel sluice .. | 55 | 73 | 18 | .. | Completed. |
| 39 | .. | Do. .. | Pedapudi channel sluice .. .. | .. | 54 | 54 | .. | 31st Mar. 1891. |
| 40 | 31 | (3) L. Earthwork. | Bhatvavilli channel .. .. | 310 | 310 | .. | .. | Do. |
| 41 | 32 | Do. .. | Parallel channel from 28th mile .. | 670 | 670 | .. | .. | Do. |
| 42 | 33 | Do. .. | Vani-Chintalapudi channel at $35\frac{1}{2}$ miles | 115 | 65 | .. | 50 | Completed. |
| | | | Bendamurlanka canal. | | | | | |
| 43 | 34 | (2) B. Land .. | Land compensation .. .. | 120 | 120 | .. | .. | 31st Mar. 1891. |
| 44 | 35 | E. Falls and weirs. | Surplus weir at 37 miles 2 chains .. | 1,290 | 963 | .. | 327 | Do. |
| 45 | 36 | (3) B. Land .. | Land compensation .. .. | 130 | .. | .. | 130 | Completed. |
| 46 | 37 | (3) C. Works .. | Bodasakurru channel head sluice .. | 26 | 113 | 87 | .. | 31st Mar. 1891. |
| 47 | 38 | Do. .. | Godilanka channel do. .. | 375 | 271 | .. | 104 | Do. |
| 48 | 39 | Do. .. | Chunchula channel do. .. | 210 | 269 | 59 | .. | Do. |
| 49 | 40 | Do. .. | Kowsika new irrigation channel sluice. | 200 | 150 | .. | 50 | Do. |
| 50 | 41 | Do. .. | Rellugedda channel head sluice .. | 256 | 191 | .. | 65 | Do. |
| 51 | .. | Do. .. | Allarem channel sluice .. .. | .. | 30 | 30 | .. | Do. |
| | | (4) Drainage and Protective works— | Drainages. | | | | | |
| 52 | 42 | C. Works .. | Panchanaddi drain inlet No. 2 .. | 107 | 66 | .. | 41 | 31st Mar. 1891. |
| 53 | 43 | Do. .. | Do. do. No. 1 .. | 133 | 85 | .. | 48 | Do. |
| 54 | 44 | (4) B. Land .. | Channel from Ralli surplus weir .. | 770 | 770 | .. | .. | Completed. |
| 55 | .. | (4) L. Earthwork. | Kunnaram drain improvements .. | .. | 10 | 10 | .. | Do. |

Revised Schedule I of the works which remained to be executed, &c.—*cont.*

| Consecutive number of items. | No. of items in the schedules printed in P.M.G. No. 428 I., dated 11th Aug. 1890. | Classification of main and sub-heads. | Names of works. | Amount provided in the sanctioned schedules. | Amount required. | Difference. | | Probable date of completion. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Increase. | Decrease. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | | | *Western Section.* | RS. | RS. | RS. | RS. | |
| | | | Venkiah and Wyeru canal. | | | | | |
| 56 | 45 | (3) C. Works .. | Fixing articulated pipe to take water from Annayakodu irrigation channel extension across Adala creek. | 916 | 741 | .. | 175 | Completed. |
| | | | Total .. | 16,101 | 17,908 | 4,696 | 2,889 | |
| | | | Establishment .. | 3,703 | 3,114 | .. | 589 | |
| | | | Total .. | 19,804 | 21,022 | 4,696 | 3,478 | |
| | | | Grand Total .. | 21,000 | 22,218 | 4,696 | 3,478 | |
| | | | | .. | 21,000 | 3,478 | .. | |
| | | | Net increase .. | .. | 1,218 | 1,218 | .. | |

Revised Schedule II of the works to be executed on the Godávari Delta System chargeable to "49. Major works (construction)" for which no detailed estimates had been sanctioned before the closure of the construction estimate on the 31st March 1890.

| Consecutive number of item. | Item No. in the schedules printed with P.M.G. No. 428 I., dated 11th Aug. 1890. | Classification. | Names of works. | Amount provided in the sanctioned schedules. | Amount required. | Difference. | | Probable date of completion. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Increase. | Decrease. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | | | I. Works which are necessary for the full development of the project which are not in themselves directly remunerative. | RS. | RS. | RS. | RS. | |
| 1 | 1 | Tools and plant .. | Priestman's dredger, "A" size, and barge. | 14,270 | 13,052 | .. | 1,218 | 31st Mar. 1892. |
| | | | II. Works which are directly remunerative in themselves. | | | | | |
| | | | *Western Section.* | | | | | |
| | | (2) Main canals and branches— I. Navigation works. | Main canal. | | | | | |
| 2 | 2 | | Vizeshweram lock .. .. | .. | 76,000 | .. | .. | 31st Mar. 1892. |
| | | | Deduct value of old lock written back to Revenue Accounts. | .. | 25,000 | .. | .. | |
| 3 | 3 | .. | Net amount .. | 51,000 | 51,000 | .. | .. | 31st Mar. 1890. |
| | | | Establishment .. | 11,730 | 11,730 | .. | .. | |
| | | | Total .. | 62,730 | 62,730 | .. | .. | |
| | | | Grand Total .. | 77,000 | 75,782 | .. | 1,218 | |

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

Chepâk,
12th March 1891.

ORDER—dated 19th March 1891, No. 268 I., Public Works.

The revised schedules of works to be carried out on the Godávari Delta System chargeable to "49. Major works (construction)," received with the foregoing note by the Chief Engineer for Irrigation, are sanctioned, and this sanction has been registered as No. 166 I. of 1890-91.

2. Ordered that a copy of these Proceedings be forwarded to the Government of India for information.

(Here enter No. 269 I., dated 19th March 1891.)

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
,, Superintending Engineer, I Circle.
,, Examiner, Public Works Accounts.
,, Revenue Department.

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ENDORSEMENT—dated 19th March 1891, No. 269 I., Public Works.

Forwarded.

(By Order.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 19th.*

*Recd.* *Encl.*

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**G.O., 19th Mar. 1891, Nos. 268 I., 269 I.**

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**MARCH.**

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## Godavari Delta System

Forwarding copy of Proceedings sanctioning the revised schedules of works to be carried out on the — chargeable to "49 Major works (construction.)"

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

## Irrigation.

Read—the following paper :—

No. 461 S.E.

*Report of progress for February* 1891.

*Main dam.*—On the removal of the water from the foundation enclosure, it was found that no damage had been done by the flood of the 20th January, a deposit of mud in the different partitions being almost the only perceptible effect.

In the space between the two front walls three 4-inch pipes, about 20 feet long, were placed vertically five feet apart and broken stone thrown into a depth of eight feet. On the 5th grout of english Portland cement was poured down the pipes until it ceased to descend. On the 8th pumping the water out was commenced. It was found that the cement had consolidated a depth of about two feet of the concrete all over and more at the pipes themselves. This had the effect of stopping some of the lower leaks and enabling cross walls to be built with concrete rammed dry behind them, thus concentrating the leaks into one narrow space. This was dealt with in the same manner; a pipe was erected and dry stone thrown down round it and cement grout poured down. On removing the water, with the exception of some soft cement at the top, a bed of concrete fairly well set was found, and by the end of the month the whole space had been filled up to about + 8 with the exception of a small well in which a pulsometer was working and which can easily be dealt with when the rest of the concrete has been raised sufficiently high. A detailed account of the grouting operations will be sent separately.

The left flank of the front wall was continued in to the rock, the whole of it thickened and the leaks through the masonry stopped. The amount "sweating" through the front wall is almost inappreciable; this and springs and leaks through cracks in the rock constitute all the water in the foundation enclosure that has to be contended with. This is being led into a sump in which is placed the centrifugal pump worked by the 12 H.P. Ramming the concrete all over the enclosure progressed rapidly.

On the 28th two sections of the semi-circular shutters were put in front of the two lowest bents in the extension of the front wall at + 10 and + 12, respectively, and the water was rising slowly behind them.

*Main workshop.*—All four disintegrators, mortar mixers and concrete mixers are ready for work as soon as the water is raised. First curve from B tramway set up.

*Right bank escape.*—Work progressing steadily. Four stone breakers at work and concrete stone being run down to the main dam in trains of two trucks at a time and tipped down shoots on to the rear wall of the main dam.

In Thekady sub-division No. II lock weir was in progress. The whole of the body-wall was completed and the foundation of the upper wing wall laid. The only portion of foundation now left to be done is that of the lower wing wall.

*Wire tramway.*—Only two turbine pipes are left to be put in position and the arrival of the new wire rope from England is all that is now wanted to complete the whole line.

*Water-shed cutting.*—Made steady progress. One sump has been sunk to within eight feet of bed level in which a pulsometer will be worked. The two pulsometers for this sub-division arrived and the boilers are on their way. The sides of the deep cutting mentioned in last report near the shaft where no rock has been found were partly sloped off; the breadth at the top of this cutting will be about 120 feet.

*Tunnel.*—Twenty-seven feet advance was made at north end by hand drilling, total length of the tunnel completed at the end of the month being 986 feet; 24 feet depth of the new shaft was excavated making a total depth of 44 feet to the end of the month. Sheds were erected for the new plant expected from Ceylon and a quantity of fire-wood cut and stacked.

*Muliyapanjan canal.*—Improving the course and tow-path, constructing bridges and building barges made good progress. The fourth reach was run dry in order to remove rocks and stumps and to point the left flank of No. II dam.

Unloading arrangements completed.

Signs of the approach of the unhealthy season have commenced and arrangements have been made to close the works at the end of March.

Periyar, (Signed) H. S. TAYLOR,
9th March 1891. Supt. of Works, No. I Periyár Division.

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*Note by the Chief Engineer, Public Works Department.*

Submitted for the information of Government.

2. The inspection notes of the undersigned, dealing with the same period as this report, have already been submitted.

(Signed) J. PENNYCUICK, Colonel, R.E.,
17th March 1891. Chief Engineer, P.W.D.

---

Order—dated 21st March 1891, No. 274 I., Public Works.

Recorded and a copy forwarded to the Government of India in continuation of this department endorsement No. 191 I., dated 2nd March 1891.

(Here enter No. 275 I., dated 21st March 1891).

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintendent of Works, No. I Periyár Project.
,, Chief Engineer for Irrigation.
,, Revenue Department.

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Endorsement—dated 21st March 1891, No. 275 I., Public Works.

Forwarded.

(By Order.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

IRRIGATION.

# Govt. of {1891} Madras.

PUBLIC WORKS.

*Dated March, 21st.*

*Recd.* *Encl.*

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**G.O., 21st Mar. 1891, Nos. 274 I., 275 I.**

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**MARCH.**

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**Periyar Works**

Forwarding a copy of the progress report of the — for February 1891.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

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**Irrigation.**
**Account.**

Read—the following papers :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 2nd December 1890, No. 502 N.L.

8 Sheets of plans and sections (in separate cover).
5 D. and A. estimates.
1 General abstract.
1 Data.
1 Specification.
1 Report.
1 Report on puddle wall.
1 Hydraulic statement.

I have the honor to forward herewith, for your approval and sanction of Government, plans and estimates, amounting to Rs. 16,900, as per margin, for the restoration of the Griddalore tank in Rápúr taluk of the Nellore district.

2. The tank is referred to in G.O. No. 1877 W. of the 26th July 1886—*vide* item No. 40 of statement No. IV printed in it, in which it is called " Restoring Adurapillai tank ; " also please see page 26 of list No. 2 printed with Irrigation Chief Engineer's memo. No. 16 C. of the 1st October 1877.

3. The desirability of restoring the tank is fully explained in the report accompanying the estimate.

4. The tank is not borne on the list of Imperial tanks of the district, and it has apparently been omitted from it as it has not been in use for years.

5. If Government approve of the restoration of the tank, I request that it may be added to the list of Imperial tanks of the district.

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To the Superintending Engineer, II Circle, dated 11th December 1890, No. 69 N.L.

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Enclosure.

Report to accompany the plans and estimates for the Griddalore Tank Restoration.

| | RS. |
|---|---|
| Amount of estimate ... ... ... ... ... ... ... | 16,600 |

The ruined tank of Griddalore in the Rápúr taluk was originally formed by a bank across the Malluru vagu, which rises near the hills around Chaganum. This bank, as will be seen from the longitudinal and cross sections, was a high one which breached at the site where it intersected the Malluru vagu.

The tank breached in several other places owing to inadequate means of disposing of the surplus water.

The old villagers state that the cut at west end of the bank, where it is proposed to build the new weir, was the place the surplus discharged. This cut is only 40 feet wide.

The tank was ruined so long ago that none can tell exactly when it was last used. There are no remains of masonry works of any kind, and if there was a sluice to the tank it must have been completely washed away in one of the breaches.

The restoration of the tank and its improvements now consist in retaining the original alignment of the bank with a slight difference in extending it at the east end to include a minor drainage valley. The bank (*vide* sketch of catchment basin) lies nearly east and north-west with water spread south-west. The catchment area is 15 square miles and the minor tanks of Pokandla, Utukuru and Chaganam will form upper tanks, thus making the Griddalore tank a terminal tank of the group. The Griddalore tank has been omitted from the list of Imperial tanks, as it has not been in use for years.

The works proposed as per accompanying plans and estimates are as follows:—

*Bank.*—Raising and widening the existing bank to + 70·0 or 6 feet above proposed F.T. supply with slopes of 2 to 1 and 6 feet top width. The bank filling the breaches will have the same slopes except in the large breach which, on account of its great height, is proposed to have a rear slope of 3 to 1 and a revetment built to the front slope with a ratio of 2 to 1. The soil is gravelly, loam, clay and gravel.

*Escape.*—The discharge from the catchment area of 15 square miles is 3,420 cubic feet per second, which is proposed to be disposed of by building a surplus weir at the west end so as to make the surplus flow into the Chavati vagu. The surplus channel into the Chavati vagu has a rapid fall, but the ground is rocky. The weir is proposed to be built with shutters 1 foot high fitting into T iron standards. The top of the shutters will lie at at 64·0 or F.T.L. maximum water being at + 66·0. The shutters when removed will give an effective depth over crest (62·0) of 3 feet, which will discharge the surplus 3,420 cubic feet a second with a length of 200 feet.

*Sluices.*—Three sluices are proposed, one sluice north of the large breach to irrigate the lands between the Malluru and Chavati vagus. A low level sluice east of the large breach and a high level sluice still further east for the lands that skirt the spur of high ground east of the Malluru vagu valley.

The ayacut will be 1,291 acres 4 cents. which at present is classed as—

| | RS. | A. | P. |
|---|---|---|---|
| 1,007 acres 68 cents. occupied dry and realizes ... ... ... | 1,019 | 2 | 0 |
| 283 „ 36 „ unoccupied, but charged sivayagama ... | 242 | 9 | 0 |
| Total ... | 1,261 | 11 | 0 |

This will, when the tank is restored and charged the water-rate of Rs. 5 per acre, bring in annually Rs. 6,455, or an increase of revenue of Rs. 5,193-5-0.

The cost of restoring the tank as per estimates herewith attached amounts to Rs. 16,900. The increase, Rs. 5,193-5-0, being equal to interest at about 30 per cent. per annum and after four years this will completely cover the outlay. The restoration of the tank was long ago under consideration, but was lost sight of till 1877, when the ryots re-opened the question. The lands forming the waterspread, except a small area held by inamdars, was not given out for dry cultivation and hence there is no heavy charge required for compensation. The small village of Adurpalli is 4·65 feet above M.W.L. and no villages will be effected by the restoration.

The catchment area of the tank is 15·0 square miles. The average rainfall in Rápúr during the last ten years has been 9" during south-west monsoon and 31" during north-east monsoon. Assuming the yield from catchment area to be quarter of the total rainfall, this would give 345 millions cubic feet sufficient to fill the tank more than four times. Suppose the tank to fill three times during the two monsoons, there will be 240 millions cubic feet available for cultivation, or sufficient for rather more than 1,000 acres for a 5-month crop allowing 216,000 cubic feet per acre.

No revetment is allowed for the bank, as the demi-official explains that the soil of the old bund is a mixture of clay and gravel
31st October 1890. (Intld.) J. H.

(Signed) H. O'CONNELL,
Executive Engineer, Nellore Division.

24th October 1890.

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From C. D. MACLEANE, Esq., Collector of Nellore, to the Executive Engineer, Nellore Division, dated 4th May 1887, No. 2221.

With reference to your letter No. 33 of the 31st January last, I have the honor to inform you that the restoration of the tank is desirable as it will afford irrigation to an extent of more than 1,000 acres. The estimate outlay of the project is Rs. 15,000, and the minimum expected annual income, about Rs. 4,000, is more than 10 per cent. per annum on the outlay. The probable amount of compensation payable for the lands to be submerged under the waterspread of the tank will not exceed Rs. 300.

No. 537 N.L.

Copy forwarded to the Chief Engineer for Irrigation with reference to his memo. No. II/69 N.L. of 11th December 1890.

2. The plans and estimates returned with the above are herewith resubmitted.

(Signed) J. HANNAN,
Superintending Engineer, II Circle.

31st December 1890.

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No. 57 I.

Submitted to Government. The estimate forwarded by the Superintending Engineer has been reduced in this office from Rs. 16,900 to Rs. 16,600 and is recommended for sanction.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

Chepâk,
17th March 1891.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

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Order—dated 21st March 1891, No. 277 I., Public Works.

The following estimate is sanctioned:—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Nellore Division.
Original Works.

| | RS. |
|---|---|
| Restoring Griddalore tank, estimate ... ... ... ... ... | 16,600 |

2. This sanction has been registered as No. 167 I. of 1890-91.

3. The Griddalore tank will be brought on the list of "Imperial" works of the Nellore district as No. 183 A.

(True Extract).

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle, with enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' Table.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 21st.*

*Recd.* *Encl.*

---

**G.O., 21st Mar. 1891, No. 277 I.**

---

**MARCH.**

---

**Griddalore Tank, Nellore Division**

Estimate of Rs. 16,600 for restoring the —, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**

Read—the following paper:—

Proceedings of the Board of Revenue (Land Revenue), dated 9th March 1891, Mis. No. 1567.

The Hon. J. Grose.

*Read*—the following letter from E. TURNER, Esq., Collector of Madura, to the Secretary to the Commissioners of Land Revenue, dated 19th February 1891, No. 73:—

I have the honor to submit, herewith, draft declaration and schedule of lands required for the Periyár project works as per margin, and to request that the Board will be pleased to move the Government to cause the same to be published in the *Fort St. George Gazette* at an early date.

| | ACS. | CTS. |
|---|---|---|
| For the 7th reach, Periyár main channel, in Kallanderi village ... | 0 | 9 |
| For the 8th reach do. ... | 12 | 41½ |
| Do. 9th do. do. ... | 2 | 51 |
| Total ... | 15 | 1½ |

2. The Deputy Collector, Madura division, may be authorised to perform the functions of a Collector under the Act and to take order for the acquisition of the lands.

*Resolution*—dated 9th March 1891, Mis. No. 1567.

Submitted to Government for approval and publication.

(A true Copy and Extract.)

(Signed) H. A. SIM,
Acting Secretary.

Mis. No. 1703, Revenue.

Transferred to the Public Works Department.

(Signed) C. A. GALTON,
Secretary to Government.

12th March 1891.

Order—dated 21st March 1891, No. 278 I., Public Works.

Ordered that the notification be published in the *Fort St. George Gazette*.

(True Extract.)

(Signed) J. PENNYCUICK, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" Superintending Engineer, VI Circle.
" Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 21st.*

*Recd.* *Encl.*

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**G.O., 21st Mar. 1891, No. 278 I.**

---

**MARCH.**

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**Lands**

Ordered that the draft notification for the acquisition of — required for the Periyár project works in the Madura district be published in the *Fort St. George Gazette.*

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.

Read—the following paper:—

From C. VINCENT, Esq., Under-Secretary to the Government of India, Public Works Department (Civil Works—Irrigation), to the Secretary to the Government of Madras, Public Works Department, dated Calcutta, 7th March 1891, No. 36 I.

In continuation of Public Works Department letter No. 202 I., dated the 15th December 1890, I am directed to forward, for information, the accompanying copy of a despatch No. 3 P.W., dated the 29th January 1891, from the Secretary of State for India, communicating sanction to the improvement and extension of the Kalingaroyen channel in the Coimbatore district at a total estimated cost of Rs. 8,71,000, of which Rs. 8,25,000 are for direct and Rs. 46,000 for indirect charges.

2. The sanction accorded by the Secretary of State has been registered in this office as No. 2 I. of 1890-91.

Enclosure.

Despatch from the Right Honorable Her Majesty's Secretary of State for India, to His Excellency the Most Honorable the Governor-General of India in Council, dated India Office, London, 29th January 1891, No. 3 (Public Works).

I have considered in council the scheme submitted with your Public Works letter No. 75, dated 10th December 1890, for the improvement and extension of the Kalingaroyen channel in the Coimbatore district of the Madras Presidency at a total cost of Rs. 8,71,000 for direct and indirect capital expenditure, which it is proposed to charge against Loan funds.

2. The need for the improvement of the Kalingaroyen channel has long been recognized and the expectation that the revenue derived from the scheme will be sufficient to allow its inclusion in the class of works constructed out of borrowed funds appears to me well founded. I accordingly sanction Your Excellency's proposals.

Order—dated 21st March 1891, No. 279 I., Public Works.

Communicated to the officers concerned for information.

2. The Superintending Engineer, IV Circle, will report, at an early date, the amount required for expenditure next year on improving and extending the Kalingaroyen channel in the Coimbatore district.

3. This sanction has been registered as No. 168 I. of 1890-91.

4. The following letter will be sent to the Government of India.

(Here enter No. 280 I., dated 21st March 1891.)

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, IV Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 21st.*

*Recd.* *Encl.*

---

**G.O., 21st Mar. 1891, No. 279 I.**

---

**MARCH.**

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## Kalingaroyen Channel, Coimbatore District

Letter from the Government of India communicating sanction of the Secretary of State to the improvement and extension of the —, communicated to officers concerned.

# PUBLIC WORKS DEPARTMENT.

## Irrigation.

Letter—from

G. T. WALCH, Esq.,
*Joint Secretary to the Government of Madras,*
*Public Works Department,*
*Irrigation Branch,*

To

The SECRETARY to the GOVERNMENT of INDIA,
Public Works Department.

Sir,

In acknowledging the receipt of your letter No. 36 I., dated 7th March 1891, communicating the sanction of the Secretary of State to the improvement and extension of the Kalingaroyen channel in the Coimbatore district, I am directed to request an early return of the portfolio of the maps and plans of the project forwarded with my letter No. 520 I., dated 16th September 1890.

I have the honor to be,
Sir,
Your most obedient servant,

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

Fort St. George,
21st March 1891.

IRRIGATION.

Govt. of {1891} Madras.

PUBLIC WORKS.

*Dated March, 21st.*

*Recd.* *Encl.*

**21st Mar. 1891, No. 280 I.**

**MARCH.**

**Kalingaroyen Channel, Coimbatore District**

The Government of India requested to return the portfolio of the maps and plans of the — project.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

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**Irrigation.**
**Account.**

Read—the following paper :—

From Major D. McN. CAMPBELL, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 4th March 1891, No. 79 E.I.

I have the honor to submit for sanction the following estimates for improving the Kodingiyur tank in Saidápet taluk under 43. Irrigation, Minor Works and Navigation, works for which neither capital nor Revenue Accounts are kept :—

| | RS. |
|---|---|
| (1) Converting the by-wash into weir at north end and constructing new laterite stone revetment to Kodingiyur tank ... ... | 4,480 |
| (2) Repairing the bund and masonry works of Kodingiyur tank ... ... | 450 |

The necessity for the work is fully explained in the report accompanying the estimate.

---

Enclosure.

Report and specification to accompany the estimate for repairing the bund and masonry works of Kodingiyur tank in Saidápet taluk, Imperial Register No. 187.

| | RS. |
|---|---|
| Amount of estimate ... ... ... ... ... ... ... | 450 |

An estimate for repairing this tank was under preparation some time back by Supervisor Mr. Trutwein, but it was left incomplete at the time of his transfer. Now under instructions from the Assistant Engineer, Tiruvallur Sub-division, this estimate is prepared providing for all that is necessary to put the tank bund in proper order.

The top level is correct, but, owing to high waves, the front slope, to a length of 600 feet to the north and 1,600 feet to the south of the middle weir, has been washed away to a considerable extent. Mere earth and turf will not save the bund from erosion, and it is, therefore, necessary that it should be made strong by revetting the damaged portions after filling up the erosions with good earth.

*Specification.*—The revetment to be of rough laterite $1\frac{1}{2}$ feet thick with 6 inches of gravel backing, and to be carried up to at least $1\frac{1}{2}$ feet above M.W.L. and the bund above it to be turfed where new earth is thrown.

Cross sections were taken in three places to show the present state of the bund as well as the proposed revetment. The other portions of bund at either ends are in fair order and require no repair.

*Surplus arrangement.*—The rough stone by-wash at the north end of tank has been washed away and the ground in rear cut up very much. A plan and estimate for converting the by-wash into a weir are now prepared as per sub-divisional officer's instructions and are herewith submitted with the necessary hydraulic particulars.

The work to be carried out according to the standard specification and to the satisfaction of the executive officer in charge of the work.

(Signed) A. MILNE, Lieut.,
Sub-divisional Officer.

Tripasur,
19th January 1891.

ORDER—dated 21st March 1891, No. 281 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Chingleput Division.
Original Works.

| | RS. |
|---|---|
| Improving Kodingiyur tank No. 187 of list of "Imperial" works, estimate ... | 4,930 |

2. This sanction has been registered as No. 169 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint-Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle, with seven enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' Table.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 21st.*

*Recd.* *Encl.*

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**G.O., 21st Mar. 1891, No. 281 I.**

---

**MARCH.**

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**Kodingiyur Tank, Chingleput Division**

Estimate of Rs. 4,930 for improving the —, sanctioned.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

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### Irrigation.
### Account.

Read—the following paper :—

From Major D. McN. CAMPBELL, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 28th January 1891, No. 31 E.I.

I have the honor to submit the following estimates for constructing a new weir and repairing the bund of Alikuli tank in Tiruvallúr taluk, Chingleput district, for your early sanction under Irrigation and Navigation works for which neither Capital nor Revenue accounts are kept. The necessity for the work is fully explained in the report accompanying the estimate :—

| | RS. |
|---|---|
| For constructing a weir ... ... ... ... ... ... ... | 5,600 |
| For repairing the bund ... ... ... ... ... ... ... | 190 |
| Total ... | 5,790 |

---

Enclosure.

Report to accompany the estimate for constructing a new weir and repairing the bund at north end of Alikuli tank (Imperial list No. 107).

| | RS. |
|---|---|
| Amount of estimate— | |
| Repairs ... ... ... ... ... ... ... ... ... | 190 |
| New work ... ... ... ... ... ... ... ... | 5,600 |
| Total ... | 5,790 |

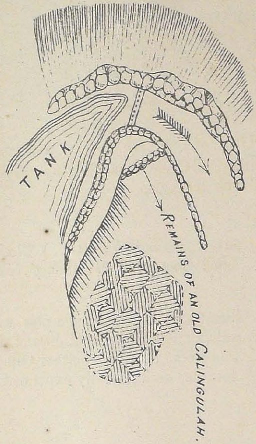
The estimate is prepared with reference to Executive Engineer's No. 4801, dated 17th February 1888, and the Deputy Collector, Tiruvallúr division, No. 114-A., dated 31st January 1890. The tank is situated on a valley almost surrounded by hills at the north-west corner of the taluk and is supplied by three hill streams which drain an area of 7½ square miles, which gives a discharge of 2,585 cubic feet per second ($D = 675 M^{\frac{2}{3}}$). It was breached some two or three years ago, carrying away the calingula, and since then there has been no wet cultivation under it. The ryots have petitioned to have their tank repaired or to have their wet lands transferred to "dry." This conversion would lead to a loss of revenue of not less than Rs. 408, taking the difference between "wet" and "dry" at Rs. 2 an acre. This would give an interest of 7·80 per cent. on

the sum (Rs. 5,230) now proposed to be expended in putting the tank in repair, which is more than enough to pay the interest on the money and the cost of upkeep. There is also the fact to be considered that the ryots will be richer with "wet lands" than "with dry."

2. To dispose of the drainage, there is already a weir * at the south end of the tank, which is 30 feet long, and, therefore, will dispose of 358 cubic feet with a head of 3 feet overfall. It is, therefore, necessary to make provision for the disposal of the remaining 2,227 cubic feet. As per calculations herewith attached a weir of 117 feet 8 inches is proposed with 32 upright stones, 1 foot high above crest, or 1 foot lower than F.T.L. and $\frac{7}{12}$ in thickness; the effective length for discharge below the top level of those upright stones will be 99 feet, which is divided into 33 spaces with a stone between each; these spaces will have a clear width of 3 feet each. This weir will be constructed at the north end of the tank bund. This is the site of a breach, through which all the drainage passes off at present. The south end is unsuited to be made to discharge the whole surplus on account of the expense it would lead to.

* Practically a bye-wash as the tail water backs up.

23rd October 1890. (Intld.) C.H.B.B.




3. The weir is to be stone in mortar, being cheaper than brick in mortar and much better suited to the purpose on account of the high overfall and the cushion. The foundation will rest on a firm half-formed sand and limestones. The ground about this locality is reddish loam mixed largely with stones from a cubic inch to a cubic foot almost round (water worm) for a depth of about 10 or 12 feet and then a sort of sand and limestone half-formed.

4. The surplus channel below the existing weir at the south end being a little too high for the 300 feet in length, provision is made in the estimate to lower this part.

The plan and estimate accompanying give particulars regarding the design and dimensions in detail.

The work is to be of the best kind and to be done in accordance with the standing specification and the custom of the department.

*Materials.*—Stones to be had within a mile distance; lime obtainable from about 7 miles near Ramanjery.

A. MILNE, Lieut.,
Offg. Ex. Engr., Chingleput division.

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No. 56 I.

Submitted to Government.

2. The design for the weir has been revised in this office. When carrying out the work, it should be considered by the Superintending Engineer whether the soil is not sufficiently firm to admit of the straight portions of the wings having their foundations stepped up two or three feet.

Chepâk,
17th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

Order—dated 21st March 1891, No. 283 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Irrigation and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Chingleput Division.
Alikuli tank, No. 107 of list of "Imperial" works.

| | RS. |
|---|---|
| 1. Original works— | |
| Constructing a weir ... ... ... ... ... ... | 5,600 |
| 2. Repairs— | |
| Repairing the bund ... ... ... ... ... ... | 190 |
| Total ... | 5,790 |

2. This sanction has been registered as No. 170 I. of 1890-91.

3. The attention of the Superintending Engineer, V Circle, is invited to para. 2 of the foregoing endorsement of the Chief Engineer for Irrigation.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle, with enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.
" Editors' table.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 21st*

*Recd.* *Encl.*

G.O., 21st Mar. 1891, No. 283 I.

MARCH.

**Alikuli Tank,**
**Chingleput Division**

Estimate, amounting to Rs. 5,790, for constructing a weir and repairing the bund of the —, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following papers:—

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| From the Superintending Engineer, II Circle, dated | 8th Oct. | 1890, | No. | 1723 K.S. |
| To " " " " | 26th " | " | " | 140 K.S. |
| From " " " " | 8th Feb. | 1891 | " | 2806 K.S. |
| To " " " " | 21st " | " | " | 32 K.S. |

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 28th February 1891, No. 3005 K.S.

As promised in para. 6 of my letter No. 2806 K.S., of 8th February 1891, I have the honor to forward herewith a revised estimate for the diversion to the Bank canal at Penumudi, in the Western delta, for your sanction.

2. I also enclose again for reference, if necessary, (*a*) the revised section of the diversion as now estimated, and (*b*) Mr. Paul's letter explaining points referred to in your No. II/140 K.S., of 26th October 1890.

3. The amount of this estimate can be met from the lump sum provision for unforeseen works.

ENCLOSURE.

Letter from J. E. PAUL, Esq., Executive Engineer, Kistna Western Division, to the Superintending Engineer, II Circle, dated 5th January 1891, No. 483 S.

[*Subject.*—Penumudi division of Bank canal, Western delta, Kistna.]

[Reference to Superintending Engineer's No. 2000 K.S., dated 10th November 1890.]

I have the honor to state that I find para. 6 of my report accompanying the above estimate is not strictly correct.

2. The diversion will take off at 32 miles 1 furlong and 594 feet and will end at 35 miles 0 furlongs and 257 feet.

The channels which the diversion will cross are—

| | Miles. | Furlongs. | Feet. |
|---|---|---|---|
| (*a*) Répalle channel at ... ... ... ... | 32 | 6 | 255 |
| (*b*) Iskapalle do. at ... ... ... ... | 33 | 7 | 3 |
| (*c*) Aravapalli channel at ... ... ... ... | 34 | 4 | 74 |
| (*d*) Nallur do. at ... ... ... ... | 34 | 6 | 478 |

The mileage given in this letter is Bank canal mileage.

3. (*a*) *Répalle channel.*—In an enclosure printed with G.O., Nos. 3572 and 3573, dated 19th December 1874, designated "No. 5, General remarks on the existing works of Western Bank canal main duct," the sluice of this channel is described by Lieutenant D. McN. Campbell, R.E., as answering its purpose well, and he allows Rs. 200 for gearings; this amount appears as "3 C. Répalle tank channel, Rs. 200" in the statement printed with Proceedings of Madras Government, No. 577 I., dated 1st October 1888. The sluice is old and would have to be rebuilt even if the canal should not be diverted.

4. (*b*) *Iskapalle channel.*—In the documents referred to in the preceding paragraph, it is shown that Rs. 500 is allowed from the sum of Rs. 15,070 for providing screw gearing for the sluice. This sluice is in good order and would not have to be rebuilt if the canal was not to be diverted.

5. (*c*) *Aravapalli channel.*—The project proposed is to take off this channel, as a branch from the Iskapalle channel, as shown in the enclosed sketch; and there can be no doubt that this is the most suitable arrangement. The existing channel is an old winding river channel in very bad order. For the head sluice from Iskapalle channel, Rs. 400 is allowed and included in the sum of Rs. 15,070 referred to in the last paragraph. A design has been prepared for this sluice, but has not yet been submitted; the estimate amounts to Rs. 900, but there will be a total saving in the revised estimate for all the works connected with Iskapalle channel and its branches of considerably over Rs. 25,000.

6. (*d*) *Nallur channel.*—Every word of para. 3 *supra* applies to the sluice for this channel.

7. With reference to para. 5 of the Chief Engineer for Irrigation's No. II/140 K.S., forwarded with the reference under reply, Colonel Mullins admits, in the paragraph referred to, that the information then given to him was not sufficient for him to decide as to the alteration of the position of the head for Iskapalle channel. I hope that the following reasons will show that any such alteration will be most unadvisable:—

I. The area irrigated from Iskapalle channel in 1889-90 was 6,572 acres, not including 743 acres irrigated from Aravapalli channel; the present bed width is 20 feet, and the breadth of the berms is ample for the widening still to be done.

II. A new head would necessitate the acquisition of a considerable area of valuable land, now under wet cultivation; and the splitting up of fields, and to this the owners would vehemently protest.

III. The new head would have to be taken across the Répalle-Penumudi road.

IV. The drainage of the country, the fall of which is nearly south-west towards the Jagajairu, would be interfered with.

V. There is a high sand ridge from Iskapalle to Répalle, and to the north of Répalle the ground is very low.

VI. The Bank canal at present silts rapidly between the present Iskapalle sluice and Mortota lock (37 miles 3 furlongs), and if the head of the channel should be made 3 miles higher up, there would be three more miles of the canal that would require annual clearance.

8. The sanctioned bed widths of the canal are given in a statement printed with G.O., Nos. 3572 and 3573, dated 19th December 1874. I enclose a statement showing the sanctioned and proposed bed widths; this question is of little importance except that with the lesser bed widths there will be less silt to clear.

The sanctioned bed widths were given on the sections when I wrote the report, but were altered when the sections were returned with your No. 1561 K.S., of 19th September 1890, as explained in my No. 354 S., dated 4th October 1890.

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No. 68 I.

Submitted to Government with a recommendation that the estimate of Rs. 22,400 be sanctioned under "Maintenance and Repairs," Kistna delta system.

CHEPÂK,
19th March 1891.

(Signed) G. T. WALCH,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 24th March 1891, No. 286 I., Public Works.

The following estimate is sanctioned :—

Irrigation.
42. Major Works (Working Expenses).
Kistna Delta System.
Western Section.
1. B. Maintenance and Repairs.
(2) Main Canals and Branches.
Bank Canal.
L. Earthwork.

| | RS. |
|---|---|
| Diversion at Penumudi, estimate ... ... ... ... ... | 22,400 |

2. This sanction has been registered as No. 171 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
,, Superintending Engineer, II Circle,
with four enclosures.
,, Examiner, Public Works Accounts.
,, Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 24th.*

*Recd.* *Encl.*

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**G.O., 24th Mar. 1891, No. 286 I.**

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**MARCH.**

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**Bank Canal, Kistna Delta System**

Estimate of Rs. 22,400, for the diversion of the — at Penumudi, sanctioned.

GOVERNMENT OF MADRAS.

# PUBLIC WORKS DEPARTMENT.

## Irrigation.
## Account.

READ—the following paper :—

From A. A. G. MALET, Esq., Executive Engineer, Kistna Western Division, to the Superintending Engineer, II Circle, dated 18th March 1891, No. 676-S.

I have the honor to submit herewith for sanction a statement of modification of allotments under 49. Irrigation, Capital Works, and to state that the expenditure on the constructing an aqueduct to carry the Iskapalle channel over Bhattiprole drain to end of February last being Rs. 750 in excess of the existing grant of Rs. 5,000, and as the work is now in good progress by departmental agency, I have made the necessary distribution of the present grants and request that the modification be sanctioned.

No. 3220 K.S.

Copy forwarded to the Chief Engineer for Irrigation, together with the statement, with a request that the transfers applied for may be sanctioned, by telegram, as it involves no increase or decrease of the total grant for the division under 49. "Capital."

(Signed) W. JOPP,
Executive Engineer,
*for* Superintending Engineer, II Circle.

21st March 1891.

ENCLOSURE.

APPLICATION for additions and modifications of allotments for Irrigation works for 1890-91.

| Division. | Main and sub heads. | Names of works. | Existing grant. | Modification of allotments applied for. | | Modification of allotments proposed. | |
|---|---|---|---|---|---|---|---|
| | | | | Reduction. | Increase. | Reduction. | Increase. |
| | | | RS. | RS. | RS. | RS. | RS. |
| Kistna Western. | | CAPITAL EXPENDITURE ON PUBLIC WORKS NOT CHARGED AGAINST REVENUE. | | | | | |
| | | 49. IRRIGATION. | | | | | |
| | | *I. Works.* | | | | | |
| | | Kistna Delta System. | | | | | |
| | | Western Section. | | | | | |
| | | Commamur Canal. | | | | | |
| | (3) B .. | Compensation for Yedlapalli channel .. | .. | .. | 114 | .. | .. |
| | (2) B .. | Do. for Commamur canal .. | 200 | 114 | .. | .. | .. |

Application for additions and modifications of allotments for Irrigation works for 1890-91—*cont.*

| Division. | Main and sub heads. | Names of works. | Existing grant. | Modification of allotments applied for. | | Modification of allotments proposed. | |
|---|---|---|---|---|---|---|---|
| | | | | Reduction. | Increase. | Reduction. | Increase. |
| | | | RS. | RS. | RS. | RS. | RS. |
| Kistna Western—*cont.* | | CAPITAL EXPENDITURE ON PUBLIC WORKS NOT CHARGED AGAINST REVENUE—*cont.* | | | | | |
| | | 49. IRRIGATION—*cont.* | | | | | |
| | | *I. Works*—cont. | | | | | |
| | | Kistna Delta System—*cont.* | | | | | |
| | | Western Section—*cont.* | | | | | |
| | | Bank Canal. | | | | | |
| | (2) I .. | Raising the right bank of Bank canal from Penumudi to Mortota. | *—1,513 | .. | *—1,513 | .. | .. |
| | (2) L .. | Improvements to Bank canal .. .. | 6,600 | 737 | .. | .. | .. |
| | (2) L .. | Diversion of Bank canal at Penumudi .. | .. | .. | 50 | .. | .. |
| | (2) O .. | Cattle-crossing at Potarazu Donka .. | 100 | .. | 100 | .. | .. |
| | (3) C .. | Constructing Arepalli channel sluice .. | 200 | .. | 100 | .. | .. |
| | | Bhattiprole Drain. | | | | | |
| | (4) C .. | Constructing Iskapalle aqueduct .. | 5,000 | .. | 2,000 | .. | .. |
| | | Total .. | .. | 851 | 851 | .. | .. |

* This represents credit afforded against estimate of Rs. 1,530 sanctioned in G.O., No. 283 I. of 12th May 1888 and subsequently debited this year to the estimate of Rs. 10,200 sanctioned in G.O., No. 586 I. of 16th October 1890.

DUGGIRALA,
18th March 1891.

(Signed) A. A. G. MALET,
Executive Engineer, Kistna Western Division.

(Signed) W. JOPP,
Executive Engineer,
*for* Superintending Engineer, II Circle.

21st March 1891.

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ORDER—dated 24th March 1891, No. 288 I., Public Works.

The modifications of allotments proposed by the Superintending Engineer are sanctioned.

2. The following deferred telegram will be sent to the Superintending Engineer, II Circle:—

Your No. 3220 K.S., 21st instant. Modification of allotments sanctioned.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 24th.*

*Recd.* *Encl.*

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**G.O., 24th Mar. 1891, No. 288 I.**

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**MARCH.**

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**Modification of Allotments**

Sanctioning certain — under 49. Irrigation, Kistna Western Division.

# GOVERNMENT OF MADRAS.

# PUBLIC WORKS DEPARTMENT.

## Irrigation.

## Account.

READ—the following paper :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated 14th March 1891, No. 3142 K.S.

I have the honor to submit, herewith, for sanction, an estimate, amounting to Rs. 4,500, for the Kaldindikodu side channel.

2. In para. 4 of my letter No. 1775 of 9th November 1889, forwarding estimate for Bantumilli canal main distributary and printed with G.O. No. 590 I. of 28th November 1889, I stated that the irrigation to the left (right was written by oversight but corrected by you) of the Kaldindikodu would be taken up by existing channels from the Polraz canal side channel. Subsequent investigation shows that this is not feasible, and the levels on the tracing herewith submitted show that the ground falls from the Kaldindikodu. It is accordingly proposed to irrigate the lands now under the Kaldindikodu on left side, some 1,500 acres, by a side channel taking off from Polraz canal side channel as shown in tracing, as well as 627 acres at present irrigated by the Vinnacotakodu on its right side. It is proposed to convert the Vinnacotakodu into a drain. It is at present used both as drain and irrigation channel. There are some 600 acres under the kodu on the left side which will be irrigated from the Chevurkodu, a roughly parallel channel not shown in tracing, but shown in linen map, and which takes off now from the Polraz side channel. The above remarks and the division officer's report accompanying will, it is hoped, sufficiently explain the necessity for the work, which I have authorized the division officer to proceed with in anticipation of your sanction, so that the present working season may not be lost. The amount of the estimate can be met from the lump sum provision for unforeseen works.

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ENCLOSURES.

REPORT.

The lands on the left side of Kaldindikodu, whose supply will be cut off when Kaldindikodu is turned into a drain, may be divided into three parts—

(*a*) From Kaldindikodu head-sluice to Vinnacotakodu.
(*b*) Lands in the vicinity of Chevur below Vinnacotakodu to Bantumilli road.
(*c*) From Bantumilli road to Korukollu branch from Pedakommileru south side channel.

2. There are 1,550 acres from Kaldindikodu to Vinnacotakodu and 627 acres under Vinnacotakodu on the right side. These cannot be supplied by any of the channels branching already from Polraz south side channel, as the country falls from Kaldindikodu towards Vinnacotakodu.

3. Hence a side channel is provided taking off from Polraz south side channel 300 feet below its head-sluice. This picks up all the existing irrigation under Kaldindikodu from its head to Vinnacotakodu.

4. The side channel is made to terminate at Pantakodu, as beyond that the lands can be commanded by Vinnacotakodu itself or by both from Pantakodu.

5. A table giving all the details regarding the side channel, its bed width, depth of water, discharge, &c., at several points is appended at the top of the longitudinal section.

6. Throughout the top width of banks is to be 3 feet and their height 2 feet above F.S.L., the berm on either side of the channel is 4½ feet from head to Ilesetticodu and 3 feet beyond that.

7. The side channel is to be provided with a head-sluice for which an estimate is submitted along with this.

8. The lands below Vinnacotakodu will be separately dealt with.

(Signed) A. B. TODD,
Executive Engineer, Gudiváda Division.

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ESTIMATE form—Abstract—Classified.

| Sub-head. | Names of works. | Amount of estimate for individual work. | Total of sub-heads. | Total for each canal or distributary. | Total of each main head. | Remarks. |
|---|---|---|---|---|---|---|
| | 49. MAJOR WORKS (CONSTRUCTION). | RS. | RS. | RS. | RS. | |
| | 49. IRRIGATION. | | | | | |
| | *Kistna Delta System.* | | | | | |
| | Eastern Section. | | | | | |
| | Gudiváda Division. | | | | | |
| | I. Works. | | | | | |
| | Pulleru Canal. | | | | | |
| | (3) Distributaries. | | | | | |
| B. Land .. | 1. Compensation .. .. .. | 1,400 | 1,400 | | | |
| C. Works .. | 2. Constructing head-sluice to left side channel of Kaldindikodu .. .. | 430 | 430 | | | |
| L. Earthwork .. | 3. Excavating left side channel of Kaldindikodu .. .. .. | 2,500 | 2,500 | | | |
| O. Miscellaneous. | 4. Fixing demarcation stones along the channel .. .. .. | 170 | 170 | 4,500 | 4,500 | |

GUDIVADA,
3rd March 1891.

(Signed) A. B. TODD,
Executive Engineer, Gudiváda Division.

14th March 1891.

(Signed) J. HANNAN,
Supg. Engineer, II Circle.

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ORDER—dated 25th March 1891, No. 291 I., Public Works.

The estimate, amounting to Rs. 4,500, for the Kaldindikodu side channel, Kistna Eastern delta, is sanctioned from the balance of the lump sum provision made for unforeseen works in the Kistna delta completion estimates, which will then be reduced to Rs. 2,72,340.

2. This sanction has been registered as No. 172 I. of 1890-91.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Cricle, with six enclosures.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 25th*

*Recd.* *Encl.*

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G.O., 25th Mar. 1891, No. 291 I.

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**MARCH.**

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**Kaldindikodu Side Channel**

Estimate, amounting to Rs. 4,500, for the —, Kistna Eastern delta, sanctioned.

# GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

Read—the following paper :—

Office note from the Examiner, Public Works Accounts, dated Madras, 12th March 1891, No. 1520.

With reference to your office note No. 226, dated 29th October 1890, inquiring what action was taken by me in the matter of adjusting to the credit of this department the value of water supplied to Government tanks by the Kurnool-Cuddapah canal since 1884-85, I beg to forward herewith, for your information, copy of letter from the Accountant-General, Madras, No. I.B.D./62. dated 14th February 1891, communicating the realizations on that score, and stating that the amounts will not be written back to the credit of the Public Works Department under the Government of India Resolution therein quoted.

2. I beg to add that, according to para. 3 of your note printed with G.O., No. 402 I., dated 24th August 1889, the amounts involved might be treated as "indirect revenue" in the administrative accounts, if you can get sanction of Government for including the amounts in my next administrative accounts, or get the Board of Revenue to include them in the next statement of indirect revenue to be rendered to my office.

Enclosure.

From T. W. RAWLINS, Esq., Accountant-General to the Government of Madras, to the Examiner of Public Works Accounts, Madras, dated 14th February 1891, No. I.B.D./62.

With reference to your letter, No. 7317, dated 10th December 1890, I have the honor to state that the value of water supplied by the Kurnool-Cuddapah canal to Government tanks in the Kurnool district has been credited to Land Revenue, as noted in the margin, and that the accounts cannot now be disturbed as they have been finally closed—*vide* para. 5 of Government of India Resolution, No. 4570, dated 25th October 1871, and also Government Order, Revenue No. 633, dated 5th September 1888, and Financial No. 436, dated 16th July 1889.

| | RS. | A. | P. |
|---|---|---|---|
| 1884-85 .. .. .. .. .. | 4,783 | 14 | 7 |
| 1886-87 .. .. .. .. .. | 5,145 | 7 | 11 |
| 1887-88 .. .. .. .. .. | 4,375 | 4 | 2 |
| 1888-89 .. .. .. .. .. | 9,775 | 2 | 8 |
| 1889-90 .. .. .. .. .. | 4,722 | 0 | 10 |

2. As regards the transactions of the current official year, the Collector will be requested to transfer them from Land Revenue to the Public Works Department.

Order—dated 25th March 1891, No. 292 I., Public Works.

The value of water supplied to tanks by the Kurnool-Cuddapah canal need not be written back to the Public Works Department, as it will be credited to the canal as indirect revenue in the administrative accounts of this department.

2. The Examiner of Public Works Accounts will credit to the canal as indirect revenue in the administrative accounts for the current year Rs. 27,362 as shown in the margin.

| | RS. |
|---|---|
| Value of water supplied to tanks from 1884-85 to 1889-90 ... .. | 28,802 |
| Deduct collection charges at 5 per cent. | 1,440 |
| Net Total ... | 27,362 |

3. The Board of Revenue will be requested in the Revenue Department to show in future annual irrigation accounts, commencing with those of the current year, the amount to be credited to the canal as indirect revenue after deducting the usual percentage of collection charges.

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, III Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 25th.*

*Recd.* *Encl.*

**G.O., 25th Mar. 1891, No. 292 I.**

**MARCH.**

**Kurnool-Cuddapah Canal**

Passing orders regarding the value of water supplied to tanks by the — being credited to the canal as indirect revenue.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**
**Account.**

READ—the following paper:—

From J. W. MARTIN, Esq., Officiating Superintending Engineer, VI Circle, to the Chief Engineer for Irrigation, dated Pámban, 18th March 1891, No. 1196 T.N.

I have the honor to request that the following modification of allotments in the Tinnevelly division may be sanctioned at an early date:—

| Item number. | | Existing grant. | Modification of allotment applied for. | | Modification of allotment proposed. | |
|---|---|---|---|---|---|---|
| | | | Reduction. | Increase. | Reduction. | Increase. |
| | PROVINCIAL IRRIGATION. | RS. | RS. | RS. | RS. | RS. |
| | 43. MINOR WORKS AND NAVIGATION. | | | | | |
| | *Works for which neither Capital nor Revenue accounts are kept.* | | | | | |
| | Original works, major. | | | | | |
| 1 | Vadakarai, Periyakulam.—Improving the —, estimate Rs. 6,070, sanctioned in G.O., No. 83 I., of 10th February 1890 .. .. .. .. | 6,070 | 1,000 | .. | 1,000 | .. |
| | TANK RESTORATION SCHEME. | | | | | |
| | *Minor works.* | | | | | |
| 2 | Lump sum grant .. .. .. .. | 7,000 | 3,000 | .. | 3,000 | .. |
| | *Repairs.* | | | | | |
| 3 | Lump sum grant .. .. .. .. | 11,422 | .. | 4,000 | .. | 4,000 |
| | Total .. | .. | 4,000 | 4,000 | 4,000 | 4,000 |

2. *Item* 1.—As compensation for land required for flood bank and new cut for channel has not yet been settled by the Revenue Department, these works cannot be commenced. The rock on which the head sluice is to be built having been found to extend into the bank in front, extra blasting has been necessary, which, with untimely floods in the river, has delayed the masonry construction. Hence the surrender.

*Item* 2.—As some of the works cannot be carried out, as anticipated at first, a portion of grant is proposed to be transferred to item 3.

*Item* 3.—As several urgent repairs, such as closing breaches, are being carried out, the existing grant has been exceeded by about Rs. 2,800. Hence an additional grant is required.

ORDER—dated 25th March 1891, No. 293 I., Public Works.

The following transfers of funds are sanctioned :—

43. Minor Works and Navigation.
Works for which neither Capital nor Revenue Accounts are kept.
Tinnevelly Division.

| *From* | | *To* | |
|---|---|---|---|
| Original Works. | RS. | Tank Restoration Scheme. Repairs. | RS. |
| Vadakarai, Periyakulam,—improving. | 1,000 | Lump sum ... ... ... ... | 4,000 |
| Establishment ... ... ... | 230 | Establishment ... ... ... ... | 230 |
| Tools and plant ... ... ... | 15 | Tools and plant ... ... ... | 15 |
| | 1,245 | | |
| Tank Restoration Scheme. Minor Works. | | | |
| Lump sum ... ... ... ... | 3,000 | | |
| Total ... | 4,245 | Total ... | 4,245 |

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, VI Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 25th.*

*Recd.* *Encl.*

**G.O., 25th Mar. 1891, No. 293 I.**

**MARCH.**

**Funds**

Sanctioning certain transfers of — in the VI Circle.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Irrigation.
### Account.

READ—the following paper :—

From J. HANNAN, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Bezváda, 25th March 1891, No. 3254 K.S.

I have the honor to forward, herewith, for your approval and sanction of Government, a statement of modification of allotments rendered necessary in the Kistna western division with reference to the actual requirements, judging from the expenditure at end of last month. The favor of communicating the sanction by wire is requested.

2. The modifications proposed do not involve any alteration in the total grant for the division.

ENCLOSURE.

II CIRCLE.

APPLICATION for modification of allotments for 1890-91.

| Item number. | Main head. | Sub head. | Names of works. | Existing grant. | Modification of allotments applied for. | | Modification of allotments proposed. | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Increase. | Decrease. | Increase. | Decrease. |
| | | | CAPITAL EXPENDITURE ON PUBLIC WORKS NOT CHARGED AGAINST REVENUE. | RS. | RS. | RS. | RS. | RS. |
| | | | 49. IRRIGATION. | | | | | |
| | | | *I. Works.* | | | | | |
| | | | Commamúr canal. | | | | | |
| 1 | 2. Main canals and branches. | F. River and hill torrent works. | Constructing an inlet at Apperu. | 1,000 | .. | 200 | .. | 200 |
| 2 | Do. .. | Do. .. | Lengthening Nakkaraju outlet. | 1,666 | 600 | .. | 600 | .. |
| 3 | Do. .. | O. Miscellaneous. | Constructing cattle-crossing at Swerna .. .. .. | 700 | .. | 150 | .. | 150 |
| 4 | 3. Distributaries. | C. Works .. | Constructing head sluice to Tungabhadra side channel .. | 1,000 | .. | 900 | .. | 900 |
| 5 | Do. .. | Do. .. | Constructing head sluice to Bápatla channel .. .. | 500 | 500 | .. | 500 | .. |
| | | | Bank canal. | | | | | |
| 6 | 2. Main canals and branches. | I. Navigation.. | Raising right bank of Bank canal above Mortota lock weir. | 9,000 | .. | 450 | .. | 450 |
| 7 | Do. .. | L. Earthwork.. | Improvements to Bank canal .. | 5,863 | .. | 350 | .. | 350 |
| 8 | 4. Drainage and protective. | Do. .. | Excavating Tungabhadra drain. | 500 | .. | 100 | .. | 100 |
| 9 | Do. .. | O. Miscellaneous. | Fixing B. M. stones on do. .. | 200 | .. | 100 | .. | 100 |
| | | | Romperu drain. | | | | | |
| 10 | Do. .. | L. Earthwork.. | Excavating the drain .. | 12,600 | 1,300 | .. | 1,300 | .. |
| | | | Guntúr nalla. | | | | | |
| 11 | Do. .. | Do. .. | Improving Guntúr nalla right bank .. .. .. | 1,000 | .. | 150 | .. | 150 |
| | | | Total .. | .. | 2,400 | 2,400 | 2,400 | 2,400 |

24th March 1891. (Signed) A. A. G. MALET,
Executive Engineer, Kistna Western Division.

25th March 1891. (Signed) W. JOPP,
Executive Engineer,
*for* Superintending Engineer, II Circle.

ORDER—dated 30th March 1891, No. 302 I., Public Works.

The modifications of allotments proposed by the Superintending Engineer are sanctioned.

2. The following urgent telegram will be sent to the Superintending Engineer, II Circle :—

"Your No. 3254 K.S., 25th instant. Proposed modification of allotments sanctioned."

(True Extract.)

(Signed) G. T. WALCH,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Superintending Engineer, II Circle.
" Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.
" Revenue Department.

IRRIGATION.
ACCOUNT.

# Govt. of {1891} Madras.

## PUBLIC WORKS.

*Dated March, 30th.*

*Recd.* *Encl.*

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**G.O., 30th Mar. 1891, No. 302 I.**

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**MARCH.**

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**Modification of Allotments, II Circle**

Sanctioning certain —.

## GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

# TABULAR STATEMENT OF MISCELLANEOUS PROCEEDINGS AND MATTERS OF ROUTINE.

### IRRIGATION,

### FOR THE MONTH OF MARCH 1891.

| Subjects. | Number and Date of Order. | Numbers and Dates of previous Orders. |
|---|---|---|
| *Contractor Chinnasawmy, South Arcot district.*—Proceedings, Judicial Department, recording Proceedings, Public Works Department, sanctioning the criminal prosecution of — on the charge of bribing certain public servants, recorded. | 2nd Mar. 1891, No. 195 I. | 11th Dec. 1890, No. 742 I. 7th July 1888, No. 2050 W. |
| *Crops in the South Arcot division.*—Report of the state of —, recorded. | 2nd do. do. No. 196 I. | ...... |
| *Grant under 43. Minor Works and Navigation.*—Orders on Proceedings, Financial Department, sanctioning additional —. | 2nd do. do. No. 197 I. | ...... |
| *River embankments in the Tanjore division.*—Appropriating Rs. 1,000 required for repairs to —. | 3rd do. do. No. 199 I. | ...... |
| *Modification of grants.*—Directing the prompt issue of orders on applications for —. | 4th do. do. No. 201 I. | ...... |
| *Minor Irrigation works.*—Proceedings, Board of Revenue, distributing the sum of Rs. 4,50,000 sanctioned for — for 1891-92, communicated to Superintending Engineers for information. | 4th do. do. No. 207 I. | 28th Jan. 1891, No 78 I. 23rd Jan. 1891, No. 70 I. |
| *Erratum* in G.O., No. 3 I., dated 5th January 1891. | 5th do. do. No. 210 I. | ...... |
| *Periyár project.*—Ordered that the progress report of the — for January 1891 be forwarded to the Government of India. | 5th do do. No. 211 I. | ...... |
| Forwarded ... ... ... ... ... | 5th do. do. No. 212 I. | ...... |
| *Preliminary Budget for "Minor Works and Navigation."*—The Government of India informed of certain modifications in the — for next year. | 5th do. do. No. 213 I. | 2nd Mar. 1891, No. 197 I. 22nd Jan. 1891, No. 67 I. 4th Feb. 1891, No. 102 I. 2nd Jan. 1891, No. 78 I. |

| Subjects. | Number and Date of Order. | Numbers and Dates of previous Orders. |
|---|---|---|
| *Irrigation Cess Fund.*—Proceedings, Revenue Department, withdrawing Rs. 4,000 from the grant under — to the Salem district, communicated to the Superintending Engineer, IV Circle. | 6th Mar. 1891, No. 214 I. | ...... |
| *Rushikulya project.*—Letter from the Government of India requesting reply to letter calling for explanation or to the necessity for an additional grant for the —, recorded. | 6th do. do. No. 215 I. | ...... |
| *Surrender.*—Passing orders regarding the — of Rs. 50,000 from the allotment for the Buckingham canal under Capital Account. | 6th do. do. No. 216 I. | ...... |
| *Revenue report of Irrigation works in Rajputana for* 1889-90.—Review by the Government of India of the —, communicated to the Chief Engineer for Irrigation. | 7th do. do. No. 223 I. | ...... |
| *Transfer of funds, I Circle.*—The — proposed by the Superintending Engineer, sanctioned. | 9th do. do. No. 231 I. | ...... |
| *Transfer of funds, III Circle.*—Sanctioning certain—. | 9th do. do. No. 232 I. | ...... |
| *Plans of the Rushikulya project.*—The Government of India requested to forward the — if not sent to the Secretary of State. | 9th do. do. No. 234 I. | 4th Sept. 1890, Nos. 482-83 I. |
| *Minor Irrigation works.*—Proceedings, Revenue Department, recording Proceedings, Board of Revenue, revewing the progress reports of — up to end of November 1890, recorded. | 10th do. do. No. 235 I. | ...... |
| *Irrigation rates.*—Proceedings, Revenue Department, ordered that the Government of India be addressed with reference to the question raised by them as to whether the — charged in this Presidency bear the relation they should to the value of the crop raised, recorded. | 10th do. do. No. 236 I. | ...... |
| *Government of India selections.*—Twelve copies of the — No. CCLXIX containing papers relating to the Sangam anicut project, forwarded to the Chief Engineer for Irrigation. | 10th do. do. No. 237 I. | ...... |
| *Rushikulya canal.*—Letter from the Government of India forwarding the Inspection report of the — in the Ganjam district by Colonel Home, R.E., communicated to the Chief Engineer for Irrigation. | 12th do. do. No. 239 I. | ...... |
| *Transfer of funds.*—Sanctioning certain — ... | 13th do. do. No. 250 I. | ...... |
| *Travelling allowance.*—The grant of — to lascars sanctioned for the special work in the upland taluks of the Kistna district under para. 529 A. of the Public Works Code, sanctioned. | 13th do. do. No. 251 I. | 27th Oct. 1890, No. 2857 W. 30th Jan. 1891, No. 82 I. |
| *Transfer of funds.*—Sanctioning certain — ... | 14th do. do. No. 252 I. | ...... |
| *Transfer of funds.*—Sanctioning certain — ... | 14th do. do. No. 253 I. | ...... |

| Subjects. | Number and Date of Order. | Numbers and Dates of previous Orders. |
|---|---|---|
| *Report on the state of the season in Chingleput.*—Proceedings, Public Works Department, communicating to the Superintending Engineer, V Circle, Proceedings, Revenue Department, passing orders on the —, communicated to the Chief Engineer for Irrigation, for issuing such instructions as may be necessary. | 16th Mar. 1891. No. 254 I. | ...... |
| *Report on the state of the season in Coimbatore.*—Proceedings, Revenue Department, approving the instructions issued by the Board of Revenue on the —, and directing the preparation and submission of the programme ordered in G.O., No 127, dated 19th February 1891, communicated to the Chief Engineer for Irrigation. | 17th do. do. No. 264 I. | ...... |
| *Transfer of funds.*—Sanctioning certain — ... | 17th do. do. No. 265 I. | ...... |
| *Form of letter of credit to the Executive Engineer, Vizagapatam division.*—The Examiner, Public Works Accounts, authorised to issue credit to the extent applied for —. | 17th do. do. No. 266 I. | ...... |
| *Rushikulya project.*—Letter from the Government of India returning the plans relating to the —, communicated to the Chief Engineer for Irrigation. | 19th do. do. No. 270 I. | ...... |
| *Transfer of funds.*—Sanctioning certain — ... | 19th do. do. No. 271 I. | ...... |
| *Indent.*—Ordered that the Government of India be informed of the number and date of — referred to in telegram of the 25th October, forwarded to the Secretary of State. | 20th do. do. No. 272 I. | ...... |
| The Government of India informed accordingly. | 20th do. do. No. 273 I. | ...... |
| *Transfer of funds, I Circle.*—Sanctioning certain —. | 20th do. do. No. $\frac{273}{A}$ I. | ...... |
| *Expenditure incurred by the several Tank Restoration Survey parties.*—Circular letter from the Examiner, Public Works Accounts, to all Executive Engineers to furnish monthly particulars of —, recorded. | 20th do. do. No. 276 I. | ...... |
| *Turbine for the Periyár project.*—Letter from the Director-General of Stores, forwarding requisitions to be furnished with the information asked for by Mr. A. Rendell regarding another —, recorded with reference to G.O., No. 262 I., dated 17th March 1891. | 21st do. do. No. 282 I. | 3rd July 1890, No. $\frac{368}{A}$ I. 12th July 1890, Nos. 1884-85 W. 12th July 1890, No. 1883 W. |
| *Dredger required for the Godávari Eastern division.*—Ordered that the Director-General of Stores be furnished with the explanation called for by him regarding the — | 23rd do. do. No. 284 I. | ...... |
| The Director-General of Stores addressed on the subject. | 23rd do. do. No. 285 I. | ...... |

| Subjects. | Number and Date of Order. | Numbers and Dates of previous Orders. |
|---|---|---|
| *Nellore tank.*—Proceedings, Revenue Department, approving the proposal to revise the classification of the —, communicated to the officers concerned. | 24th Mar. 1891, No. 287 I. | ...... |
| *Letters of credit applied for by the Executive Engineer, Godávari Eastern division.*—The Examiner authorised to issue credits to the extent applied for — for March 1891. | 25th do. do. No. 289 I. | ...... |
| *Correspondence.*—Resolution of the Board of Revenue furnishing six spare copies of its Proceedings, No. 1, dated 2nd January 1891, recorded. | 25th do. do. No. 290 I. | ...... |
| *Ariyagosti channel, South Arcot district.*—Informing the petitioners of Chidambaram taluk requesting to be permitted to take water from the — by means of a cut in its bank, that it cannot be done; but that arrangements have been made to improve the Manambathan and Morathu channels for an increase of water-supply to their villages. | 25th do. do. No. 294 I. | ...... |
| *Indirect revenue.*—Proceedings, Revenue Department, communicating Government Order, Public Works Department, directing to credit against certain systems the amounts noted against them as — in the accounts of the current year, recorded. | 25th do. do. No. 295 I. | ...... |
| *Transfer of funds, V Circle.*—Sanctioning certain —. | 26th do. do. No. 296 I. | ...... |
| *Transfer of funds, VI Circle.*—Sanctioning certain —. | 26th do. do. No 297 I. | ...... |
| *Tents of No. 5 Tank Restoration Party.*—Appropriating Rs. 57 for repairing two —. | 28th do. do. No. 298 I. | ...... |
| *Transfer of funds, South Arcot division.*—Sanctioning certain —. | 28th do. do. No. 299 I. | ...... |
| *Transfer of funds, I Circle.*—Sanctioning certain —. | 28th do. do. No. $\frac{299}{A}$ I. | ...... |
| *Transfer of funds, Periyár project.*—Sanctioning certain —. | 30th do. do. No. 300 I. | ...... |
| *Transfer of funds, I Circle.*—Sanctioning certain —. | 30th do. do. No. 301 I. | ...... |